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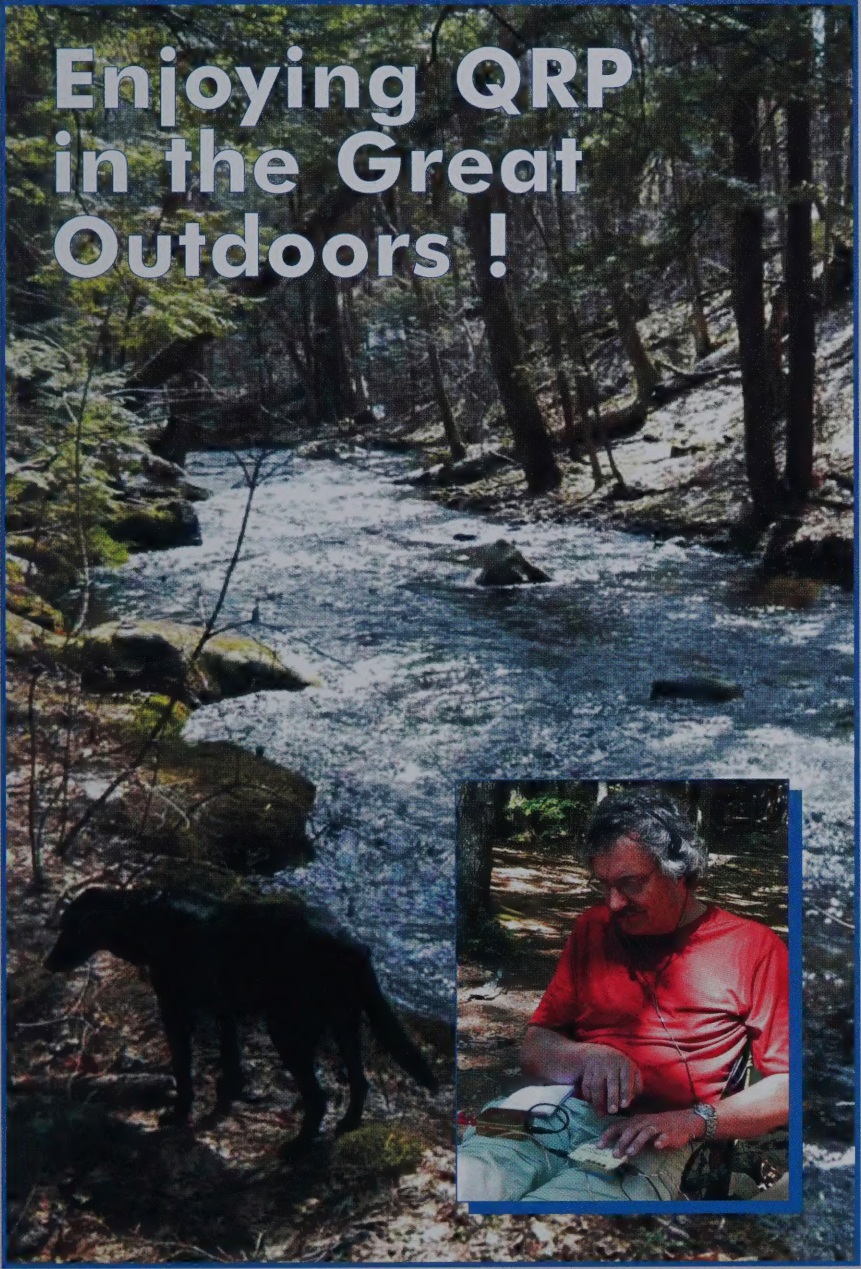
QRP Quarterly

Journal of the QRP Amateur Radio Club International

Volume 50 Number 1
Winter 2009
$4.95

Enjoying QRP in the Great Outdoors !



- *Plan Now for FDIM 2009!* Advance Information and Registration Forms Inside
- Space QRP—N3TL Explains How to Make QRP Satellite QSOs
- AA1TJ's Minimalist Radios Use Very Few Parts
- AK2B Builds a Receiver Using Modules from Kits and Parts (.com)
- Contest Results—
  2008 Silent Key Memorial Sprint
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  2008 Fall QSO Party

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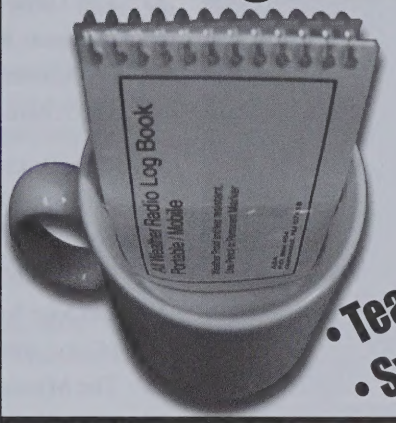

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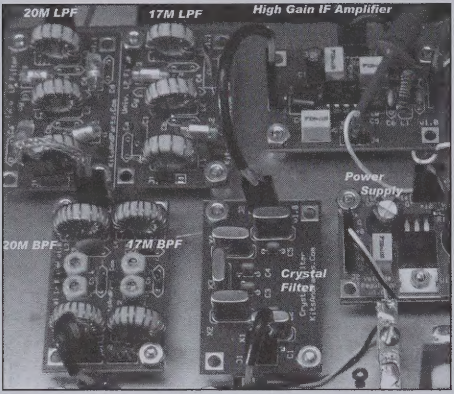

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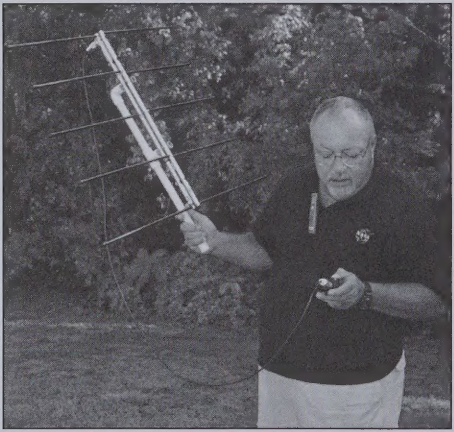

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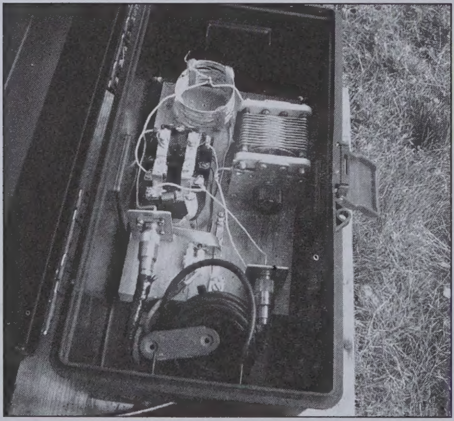

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Letter to the Editor

A New QRP Convert!

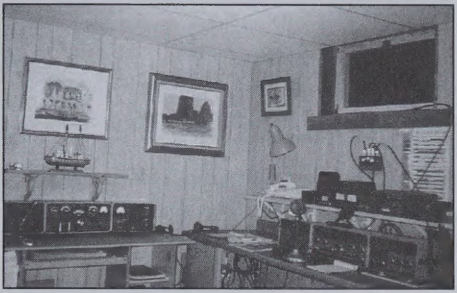
Dear *QRP Quartery* Editor:

After moving from my home up North to a condo in the South, with all its antenna restrictions, my ham shack had to go. In order to continue my hobby, I turned to QRP radio and I could not be happier.

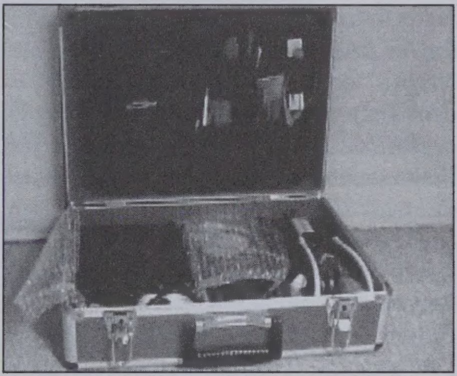
My old ham shack: How times do change! Push this, turn that. And when the green light flashes, say something. If the red light comes on, check for a loose connection or a wire not plugged into the right place. Maybe it's the antenna. Check it out. Climb the tower. Hang on tight and be careful. If the yellow light flashes in sync with the green light and the red light goes out, call for help!

My Florida ham shack: How simple and oh so much more fun! Thanks to QRP radio.

Ray Vaillancourt, N4EAT
Gulfport, FL



N4EAT's old shack...



...and the new QRP shack.

The Position of Editor of QRP Quarterly *is presently vacant.*

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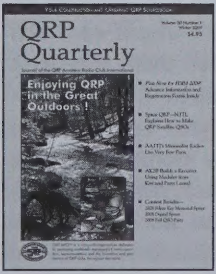

On the Cover—

Jim Cluett, W1PID enjoys operating outdoors year-round, and has chronicled some of his adventures in the "Outdoor Radio" article that starts on page 18. His photos really show the beauty of nature at some scenic venues for QRP operating. Because our articles are printed in black-and-white, we have also reproduced some of his best photos on the inside back cover, where we can print them in full color!

From the President

Dick Pascoe—G0BPS

president@qrparci.org

Readers may have noticed a missing "From the President" in the last issue. A stream of personal difficulties including the loss of both my parents took over my priorities to other matters. I am glad to say that our family is back in the real world and my wife and I are looking forward to a short vacation a few days after I sit writing this. We are heading for a winter cruise to Denmark, Norway and other snowy places.

Readers will also notice that there is no "From the editor's Desk" in this issue. I regret to have to inform you that our editor for the past year Ted Bruce KX4OM has resigned through personal reasons. Ted has done a superb job. We knew it was going to be difficult to follow in the steps of Mike Boatright but Ted stepped up to and passed the mark. We shall miss his enthusiasm and dedication. I am very grateful that Ken Evans W4DU and John King KB3WK stepped in to produce this issue for us. So: *Position Vacant: Editor of the VERY best QRP magazine in the world. Salary negotiable as long as it is under $1 per issue. Prestige immense!*

What a year this has been in election time, the infighting, below the belt jibes, outright scandalous claims, fist fights and that was just in Zimbabwe! We in the rest of the known world outside the US have been watching the US election process with some fascination right from the early days of Obama *v* Clinton. It seems very strange to us in the UK the she will now be in charge of your "Foreign Affairs." What a victory for the democrats, lets just hope that he will keep all his promises. BUT, speaking as a local politician over here I somehow doubt it will happen as promised! Watch the news, we in the UK should be having our own parliamentary elections in the very near future too.

Our two countries are in great difficulties with job losses increasing and businesses closing, banks folding and house prices tumbling. My own house has dropped a staggering 20% in value and I know this is echoed in many parts of the US.

However, whilst it is doom and gloom for us over here there is good news for all y'all in the USA. This time last year the US Dollar bought fifty UK Pence ($2 = £1), now the pound has fallen against the dollar to under $1.50 = £1. This makes a trip to the UK a much more viable proposition but not so good for us over here. Whereas last year, air fares were fixed with the high price of oil prices are falling again, my own trip to the US in 2009 is quite a bit cheaper than previous years though not as cheap as when the Gulf War was on.

On a more personal note, I have been having fun writing again, doing some equipment reviews for magazines. The latest being a small portable mag loop that fits into a small box, ideal for vacations. Although primarily a QRP antenna a 100 watt version is on the way. See http://www.g4tph.com/ for more information.

On the vacation front, when I met up with Hank K8DD on the Isle of Man a couple of years ago I was fascinated to see him lug a large tube affair out of his car and proceed to unpack all the antennas, feedline etc from this box. I have waited a long time to find the right one and managed to get one off the wonderful auction site that shall remain nameless for a measly $4.12, YUP 4 dollars and twelve cents or in English £2.75 (plus shipping of course.

For those that don't realise I have just bought a hard case golf bag used for transporting golf clubs in aircraft (see the photo) it is big enough to get lots of antennas stuff in there providing the maximum length is not more than four feet (4 ft) and with a diameter of about a foot will take a huge amount of antennas and other radio stuff. When flying just ask for a golf case discount too! (Just don't tell them you don't have golf clubs in the case).

It is THAT time of year again, Dayton and FDIM is only a few months away. We have all the rooms booked, the event planning under way and the six high profile speakers booked. As well a recently retired Rev George Dobbs G3RJV, we have Oleg Borodin RV3GM who is coming from Russia to talk about QRP in Russia. Oleg is the President and Secretary of the Russian QRP club of which I am proud to be an honorary member.

Chuck Adams K7QO is speaking about how to use an oscilloscope and what a digital scope does for you. Ed Hare W1RFI on the test equipment and methods used by the ARRL Lab for Product Review testing, with an emphasis on how hams can do some of the testing with less-expensive test equipment. Dave Cripe NM0S discusses Class E amps for QRP, and also Roger Hayward will talk on a subject yet to be agreed.

I have known George and Chuck for many, many years and they are a joy to listen to. Ed is another who could make something like "200 ways to skin a racoon" seem fascinating. Dave comes highly recommended and if Roger is as good as his dad he will be excellent. Watch the web pages www.qrparci.org for more details closer to FDIM.

FDIM also brings us closer to another event, the prestigious QRP HALL OF FAME. The full details are also elsewhere in this issue but just a reminder that whoever you nominate MUST have made a significant impact on the QRP community and not just in your own local club. Have a look at those who have been elected and then consider the impact they have made. Use that to judge your nomination. We often get nominations that just don't stand up to the criteria of "significant impact." The best way to judge it is how the audience at FDIM will respond to the announcement. If they all go "YES!" you know you have got it right, if they go "who?" you got it wrong.

The rooms for FDIM will shortly be announced and Hank K8DD will be arranging them as usual. Please do NOT call the hotel direct, 1, you will be charged more than if you book with us and 2, we have almost all the rooms booked for us so you may not get in! Wait until Uncle Hank gets the rooms announced or check with him at qrprooms@netzero.net

That's it for now….

—TTFN de Dick G0BPS

••

QRP News

Happy Indian Hams Get Some New Radios

The pictures in this story are just a few of the twenty happy Indian amateurs as they each are given an MFJ 9020 twenty meter SSB QRP radio. These hams are made up of school students, teachers, emergency coordinators and others that promote amateur radio in India. This was made possible by QRPers on two continents and MFJ Enterprises, Inc.

It all started at HamCom in Plano, TX when Ms. Bharathi Prasad, VU2RBI, Chief Co-Ordinator of National Institute of Amateur Radio (NIAR) in India saw a NC-40A at the QRP booth. Bharathi works to spread amateur radio in India via conducting classes herself and assisting others in the country to do the same. She told Ken Evans, W4DU (U.S. member of GQRP and Vice President of QRP ARCI) that she had recently graduated 18 school students from one of her amateur radio classes and all had passed the licensing test. They were lacking the means (as are many young Indian amateurs) to obtain radios to enable them to operate from home. Thus they are limited to occasional operating from club stations.

Bharathi was trying to provide them with home equipment to ensure their continued interest in amateur radio. QRP radios seemed to be her solution as they are small and relatively inexpensive. Ken knew that GQRP was in possession of some NC-20s remaining from that project which gave radios to amateurs world wide. However, the hams in India needed SSB radios and the NC-20 was CW only. George Dobbs, G3RJV was contacted and it was decided it would fulfill the spirit of the original project to sell the NC-20s and use the proceeds to purchase SSB radios for India.

GQRP members in both the U.K. and the U.S. assisted in the sale and money was raised to purchase twenty MFJ 9020 transceivers. The pictures in this article are a result of this effort. The current reports from India are that all 20 hams are now active and enjoying twenty meter SSB. They are also using the radios for training and demonstrations of amateur radio.

Special thanks go to Graham Firth, G3MFJ and Ken Evans, W4DU who coordinated the sale in the U.K. and U. S. respectively. George Dobbs, G3RJV for his willingness to provide the equipment to India. We also thank Martin Jue, K5FLU and Richard Stubbs, KC5NSZ, both of MFJ, for providing the club with a substantial discount on the radios.

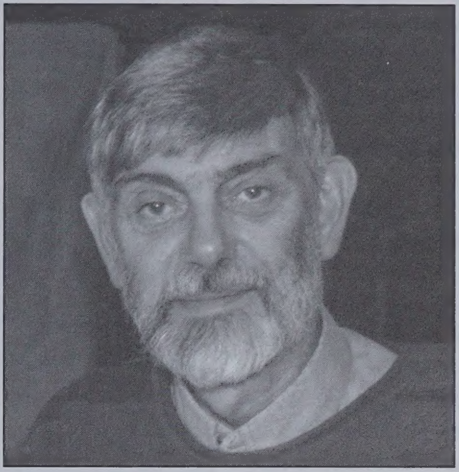

Photo 1—George Dobbs, G3RJV, who led the effort.

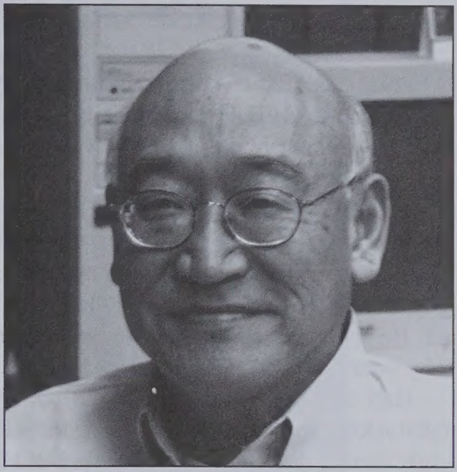

Photo 2—Martin Jue, K5FLU, CEO of MFJ, provided the radios at a discount.

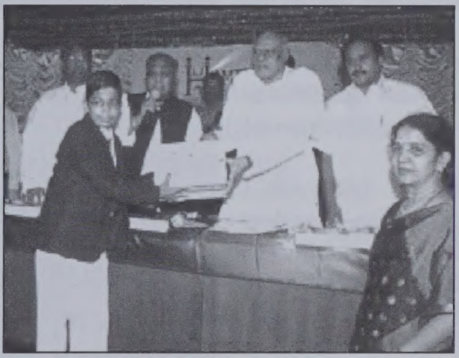

Photo 3—Naman Batra, VU3NBA, is a schoolboy in the Delhi Public School.

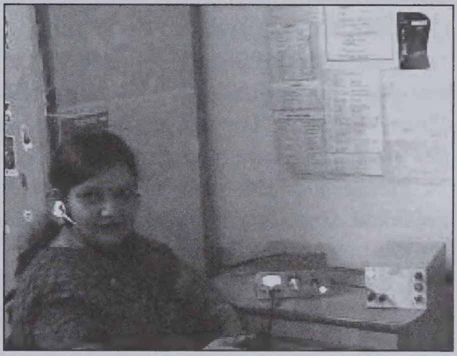

Photo 4—Mrs. Vineeta Mathur, VU3DXX, is a teacher.

Photo 5—K. Leela Krishna, VU3LGX, is a very active DXer and volunteer in his national amateur radio organization.

Photo 6—Dr. Sanjeev Attri is interested in promoting ham radio to the school children of Nahan.

QRP Hall of Fame

Members will recall that this is the time of year for the call for nominations for election to the QRP-ARCI "QRP Hall of Fame."

You can submit nominations by either postal mail or Internet e-mail but they must include the following information:

- Name & Call of person nominated
- Name & Call of person making the nomination
- A full description of why you think your nominee should be in the QRP Hall of Fame

Remember, we may not know this person and you must convince us the person is worthy. Things such as "John Doe is a great guy and always helps out at the club" will guarantee he is rejected. Be specific in your recommendation and try to persuade us why your person should be in the HOF.

Hall of Fame rules state, "The voting body consists of the QRP ARCI Board of Directors, President, Vice-President and last eight members inducted into the Hall of Fame. Nominations may be submitted by anyone, whether a member of the QRP ARCI or not. Similarly, membership is not required for someone to receive the honor, since this is an award to recognize those who have made great contributions to the QRP community, not just to the QRP ARCI."

If no nominations are received or the nominee(s) receive(s) less than the required 2/3 vote there will not be an induction at Dayton for 2009. The BOD is adamant that it is not a requirement that we will have an induction.

Please forward your nominations to BOTH QRP ARCI President (president@qrparci.org) AND to the Vice President (vp@qrparci.org). Nominations in writing should be sent direct to Ken Evans W4DU and Dick Pascoe G0BPS at the following addresses:

Dick Pascoe, G0BPS
Seaview, Crete Road East,
FOLKESTONE, CT18 7EG
U.K.

Ken Evans, W4DU
848 Valbrook Ct.
Lilburn, GA 30047
U.S.A.

The closing date for nominations is March 1, 2009. When a nomination is received, a confirmation e-mail or letter will be sent to the person making the nomination. If you nominate someone and do not receive a confirmation, we did not receive it. You will need to receive a confirmation to insure your nominee will be considered.

—Dick Pascoe, G0BPS,
and Ken Evans, W4DU

Members QRP ARCI Hall of Fame, as of January 2009:

Chuck Adams, K5FO (1998)
Brice Anderson, W9PNE (1996)
Rich Arland, K7SZ (2002)
Dave Benson, NN1G (1999)
Harry Bloomquist K6JSS (2008) (Silent Key)
Fred Bonivita, K5QLF (2007) (Silent Key)
Michael Bryce WB8VGE (2000)
Wayne Burdick, N6KR (1998)
George Burt, GM3OXX (1996)
Jim Cates, WA6GER (1998)
L. B. Cebik, W4RNL (1999) (Silent Key)
Arnold (Arnie) Coro, CO2KK (2003)
Mike Czuhajewski, WA8MCQ (1997)
Tom Davis, K8IF (1996)
Doug DeMaw, W1FB (1992) (Silent Key)
Rev. George Dobbs, G3RJV (1992)
James Duffy, KK5MC (2007)
Ken Evans, W4DU (2008)
Joe Everhart, N2CX (2000)
Graham Firth, G3MFJ (2003)
Tony Fishpool, G4WIF (2003)
Dieter ("Diz") Gentzow, W8DIZ, (2005)
Paul Harden, NA5N (1999)
Wes Hayward, W7ZOI (1996)
Doug Hendricks, KI6DS (1997)
George Heron N2APB (2001)
Bill Kelsey, N8ET (2004)
Ian Keyser, G3ROO (2004)
Hank Kohl K8DD (2007)
Jim Kortge, K8IQY (2002)
Roy Llewellyn, W7EL (1992)
Rick Littlefield, K1BQT (1996)
Dick Pascoe, G0BPS (1997)
Randy Rand, AA2U (1992)
C. F. Rockey, W9SCH (1996)
Eric Schwartz, WA6HHQ (2005)
Gus Taylor, G8PG (1998)
Steve Weber, KD1JV (2004)
Adrian Weiss, W0RSP (1996)
Peter Zenker, DL2FI (2001)

<<< Announcing FDIM 2009! Information starts on page 9 >>>

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See http://www.qrparci.org (QRP Toy Store link) for pictures

Idea Exchange

Technical Tidbits for the QRPer

Mike Czuhajewsi—WA8MCQ
wa8mcq@verizon.net

In this edition of the Idea Exchange:

Magnetic Loop Tuning Capacitor, N2CX
Correction to the RF Activated Switch Schematic
Breadboard with Spring Connections for HF Radio Circuits, AI2T

Magnetic Loop Tuning Capacitor

In the January 1991 issue I presented the very first Technical Quickie (an audio oscillator) from Joe Everhart, N2CX. He promised me an endless string of Quickies for as long as I wanted to publish them in the QRP Quarterly. *In this issue, eighteen years later, we present Quickie #68—*

Recently, my hamming has been restricted by having to operate from within a rented house with no possibility of stringing up an outside antenna. Fortunately it was a wood frame structure and I was able to set up a magnetic loop in a second floor bedroom. For convenience sake I used a commercial loop that gave moderate results on 20 and 40 meter CW. But being an inveterate homebrewer I wanted to build my own.

Research in ham literature and on the Internet unearths quite a bit of info on loop construction using available materials, but high performance tuning capacitors are either very expensive or require uncommon materials or structures. This Quickie shows an evolving design for a high Q variable capacitor of unique construction.

Good performance in magnetic loops dictates elimination of loss to the greatest degree possible. The usual types used are either spit stator conventional rotary caps, pricey vacuum variables or homebrew trombone type devices.

Yet another constraint in making effective loops is minimizing the resistance of any mechanical connections. I chose to use commonly available aluminum flashing as a flat conductor rather than the more common copper or aluminum tubing. While mechanically flimsy, it is usable for indoor loops and quite inexpensive. In addition, there are no mechanical joints at all in my loop design. Coupling to the feedline is via a coupling loop and the tuning capacitor is constructed using the ends of the flashing that comprise the loop itself. The whole design will be described in the future but, as mentioned above, the tuning capacitor structure is the focus of this Quickie.

Figure 1 shows the mechanical concepts. Basically, the capacitor is a flat plate structure that overlaps the two ends of the loop with dielectric material between them for insulation and to give a boost in capacitance due to the enhanced dielectric constant of the insulating material. The left hand conductor is glued to a low loss polycarbonate base plate for rigidity. A thin sheet (or multiple sheets) of Teflon$^{®}$ or polyethylene plastic are glued to the top of the left hand conductor. They overlap the bottom capacitor plate.

The right hand conductor is attached to the polycarb base plate using nylon hardware and bent to form a springy hinge. A large nylon bolt passes through the top and bottom conductors and is screwed into the base plate. A large tuning knob is placed on the bolt above the upper conductor and moves it up and down to vary spacing between the plates.

That's the basic idea, anyway. Figure 2 is a photo of the tuning capacitor prototype. It is reasonably close to the conceptual design. The base plate is larger than needed for convenience and the mechanical details are approximately as described. The flashing used is 4 inches wide and two sheets of 6 mil polyethylene are used as a dielectric material. Truth be told, in this prototype the plastic sheets are more to keep the two plates from shorting than to form a good dielectric. Also, this prototype is a capacitor by itself so is not incorporated in a loop antenna structure.

Capacitors for practical magnetic loops in the HF part of the spectrum require values of up to several hundred pF. Capacitor dimensions can be estimated from the formula:

$$C = 0.2248kA/T$$

where C is capacitance in pF, k is the so-called dielectric constant of the dielectric material, A is the area of the plates and T is the spacing between them. For reference, air and vacuum have a dielectric constant of 1, Teflon and common plastics are about 2 and glass can range from 3 to about 10. So an air dielectric capacitor with a plate spacing of 1/16 inch needs an area of just over 7 inches or about 2.75 x 2.75 inch square plates. A capacitor using 4 inch

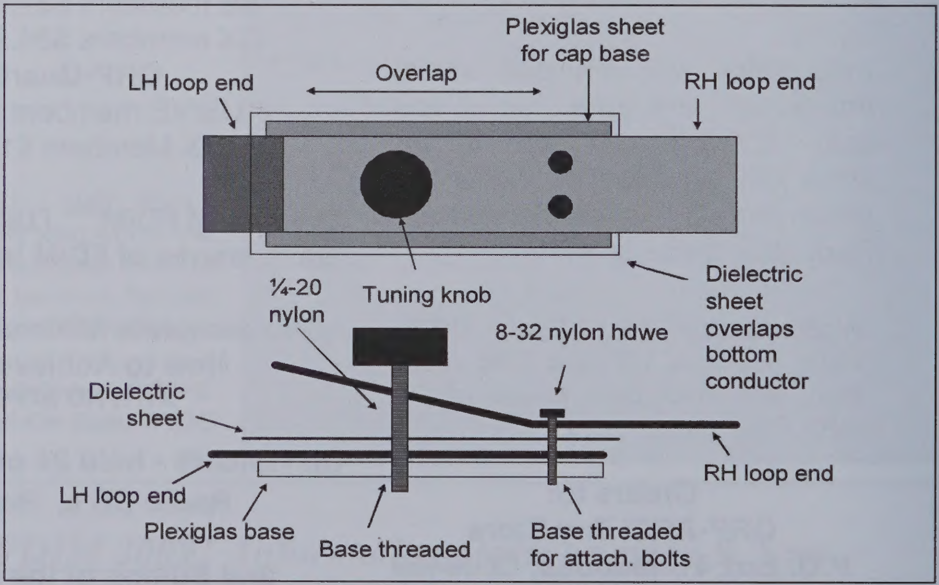

Figure 1—Basics of the homebrew tuning capacitor.

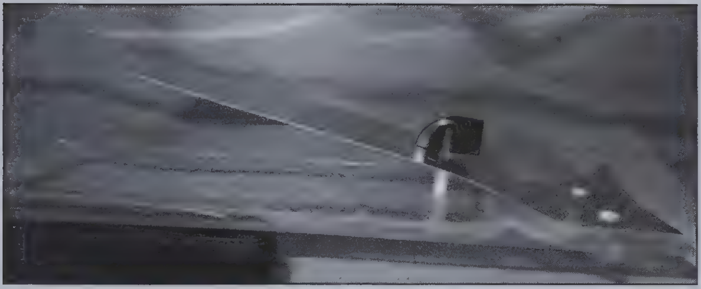

Figure 2—Tuning capacitor prototype, shown at minimum capacitance.

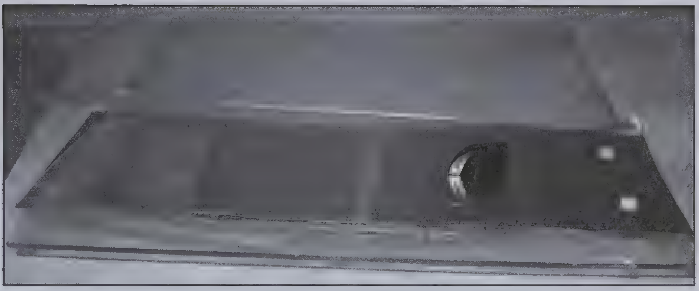

Figure 3-The movable plate is screwed down, giving maximum capacitance.

flashing that is 10 inches long will have a capacitance about 450 pF, all other things being equal. These are the target dimensions for the prototype cap.

Initial tests show that the principle is sound. A two inch 1/2-20 nylon screw is used with a tuning knob and indeed the springiness of the flashing provides good separation when the knob is screwed out and moves the plates close together when screwed in. Figure 2 shows the plates at widest spacing and Figure 3 when they're at their closest proximity.

The prototype uses a matching capacitor area of about 3.5 x 6.5 inches using material available on hand. With widest spacing the capacitance is about 25 pF, increasing to approximately 350 pF when cranked together. This is an altogether encouraging result.

Several improvements are in the works. First, the upper capacitor plate is rather flimsy and wobbles while tuning. This could cause uncertain tuning in a high Q loop. Most likely gluing a thin flat plastic sheet on top of this element will stiffen it up. Secondly, as mentioned above, the polyethylene sheets used between the plates add little to enhancing capacitance. Thicker sheets of different types of dielectric materials will be tried to evaluate their effect on obtainable capacitance values. In fact, perhaps the dielectric could be attached to the underside of the upper plate to kill two stones with one bird.

Most importantly, the tuning cap will be built into a magnetic loop antenna. Mechanical details and dielectric materials will be evaluated to observe their effect on antenna tuning, power handling capacity and, most importantly, the capacitor will be tweaked to provide the best practical overall antenna electrical performance. Stay tuned!

—de N2CX

Correction to the RF Activated Switch Schematic

The Idea Exchange in the Fall issue had an item from Frank Roberts, VE3FAO, describing an RF activated switch that he added to his WM2 wattmeter. I later received a note from K5UNY indicating that R1 was shown connected differently in Figures 5 and 6, the schematic and a suggested layout for Manhattan style construction. Frank said that the latter had R1 shown correctly, and attributed the error in Figure 5 to using new schematic drawing software. He accepted my offer of drawing a corrected schematic, which is shown here in Figure 4.

Breadboard with Spring Connections for HF Radio Circuits

This is how real homebrewers do it-making an electronics breadboard out of an actual breadboard! This was sent in by Barry Ives, AI2T—

I found soldering and unsoldering to design and build radio circuits using dead bug, cut copper, and Manhattan methods difficult. I naturally tend to try to make everything as small as possible, resulting in parts kind of haywired on top of each other. I found it even harder to rearrange circuits or add things in the middle of what I already built. I did get a 40 meter transmitter and receiver working, but what a mess! Having used breadboards for designing digital circuits I wondered if some kind of breadboarding would work better, at least for the designing stage. But I found breadboards designed for digital circuits didn't work very well for radio circuits due to stray impedances and wire size limitations.

Then I saw some early homebrew transistor radio gear in an old 1970 ARRL book, *How to Become a Radio Amateur*, which my wife bought me in a used book store. I noticed how far apart all the parts were. They used point-to-point wiring and terminal blocks like wiring in old tube equipment. I was amazed that the leads were so long and came to the conclusion that components don't need to be close together for solid state HF radio equipment to work.

I also remembered my first electronics kit, an Allied Radio "100 In One Electronics Circuits Kit," I think it was

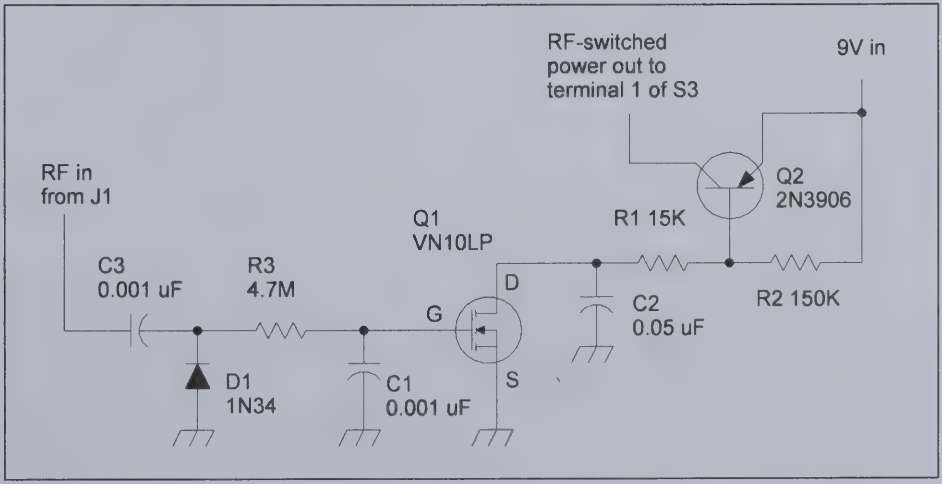

Figure 4—Updated schematic for the VE3FAO circuit, with R1 shown correctly.

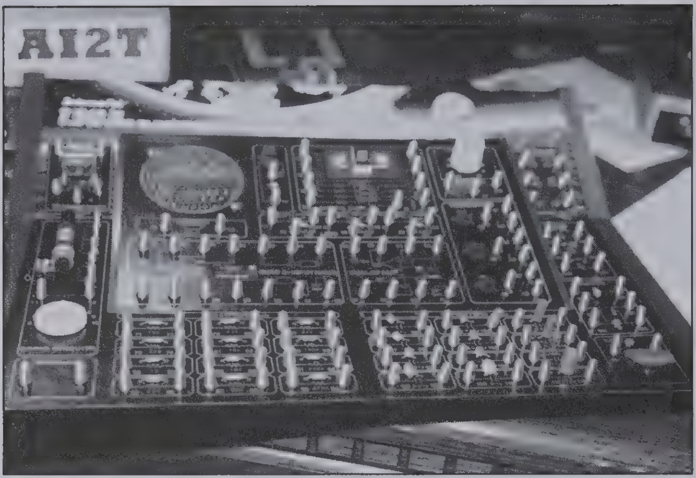

Figure 5—The Electronics Project Lab.

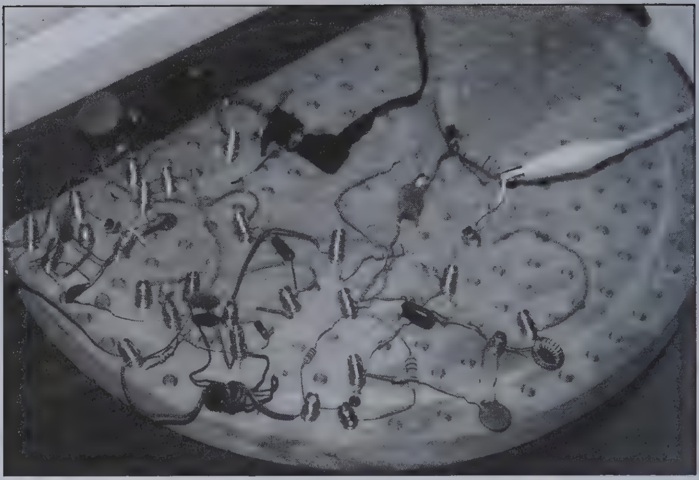

Figure 7—Electronics breadboard made from the springs and half of a *real* breadboard.

called. At age 12, I had to peddle newspapers and borrow several months worth of allowance at 50 cents a week to buy it. It used springs for connections in a breadboard fashion, and lots of semiconductors, resistors, capacitors, and other cool stuff to build all kinds of audio and radio circuits. The springs held the component leads without solder and made perfect but temporary connections for a number of wires of almost any size. I wondered where I could get some of those springs.

That very day, as I walked around a thrift store with my wife, I saw a box labeled "Science Fair™ 130 In One Electronics Project Lab," a Radio Shack product (Figure 5). Lo and behold, the whole thing was there with dozens of — you guessed it — spring connections, semiconductors, resistors, capacitors, and other cool stuff (Figure 6). I think I paid five dollars for it. It was like new, complete with an extensive manual including schematics and circuit descriptions. I don't know if Radio Shack still sells them — the integrated circuits had date codes from the 1990s. There must be others around. There might even be spring connections for sale somewhere.

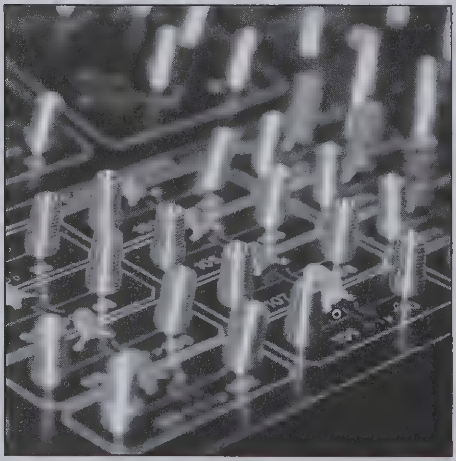

Figure 6—Close-up view showing the springs used for connections.

I wasn't tempted to try some of the circuits, such as audio oscillators, amplified crystal diode radios and the like; I wanted those springs. I found they simply unscrewed from the heavy cardboard base, after the components "permanently" attached to them were removed with long-nosed pliers. All it took was a twist. There were about 140 of them, more than enough for any project. Some of the integrated circuit parts were hooked into the springs with small wires that were soldered to the leads. All the components went into my junk box, and the remnants of the console went into the trash can.

I found an old round breadboard that had long ago broken in half, making two semicircles. Any piece of lumber would have worked, but I knew I had kept that breadboard for something. I drilled holes the diameter of the springs (3/16 inch, 4.8mm) in a loosely planned pattern, about a half inch apart, all over the board. It took a little patience with my handheld drill; a drill press would have made it easier. That was it. The breadboard was ready to go.

My plan was to build radio gear using components with long leads (no miniaturization here!), and after getting it to work, design a circuit board using whatever method(s). The difference would be that I could now move parts, design and redesign to my heart's content without having to solder, unsolder, cut circuit lands, etc. — no longer making a mess of what I was building. I could later design the printed wiring board based on the circuit I had developed on the breadboard.

I found that I could get three or four wire leads in each spring, building the circuit and adding springs as I needed them. Clip leads and other wires were used to hook up to the outside world. The first thing I built was a three-transistor transmitter with a crystal oscillator for the 40 meter band (Figure 7). Hey, it works! Now I just have to get motivated to etch that printed wiring board for it, sized to fit in an Altoids can!

—de AI2T

The fine print

Unfortunately, circumstances of late were such that a longer column in this issue was not possible but I'm hoping things will be back to normal in the future. In the meantime, if you have anything you'd like to share, please send it in. The usual rules apply—the editorial staff (me!) will take care of any editing, schematic redrawing, etc, that may be needed. Send it by snail mail, e-mail or even hand it to me in person at a hamfest, on paper or floppy or CD. Operators are standing by!

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FDIM 2009

Thursday a full day of Seminars

Saturday Evening Awards Banquet Door Prizes

Four Days in May
May 14-17 2009
Thursday thru Sunday

Friday spend some time with vendors or attend one of our training sessions

- Registration and getting acquainted begins Wednesday evening.
- Seminars are most of the day Thursday, with "meet the speakers" and an open room for some casual show and tell and plenty of time to swap tales.
- Friday daytime is open to attend the Hamvention® and visit the QRP-ARCI Toy Store.
- Friday afternoon and evening activities usually include "show and tell", vendor displays and a judged home brew contest.
- Saturday is again open for the Hamvention, and we have a great social event, banquet, awards presentation and door prizes that evening.
- Sunday is the Hamvention®, and check-out.

Thursday Evening Meet the Speakers

Friday daytime, take a break attend the Hamvention

Thursday Evening Casual Show and Tell

Wednesday evening Registration and get together

Thursday Afternoon Buildathon

Friday Afternoon and Evening
Vendor Night
Judged Competition
Home Brew Displays

Saturday Morning Off to Hamvention or see the sights

FDIM Registration and
Hotel Reservation
available on www.qrparci.org

Much More! Watch the web site www.qrparci.org

Guest/Spouse Program

Home Brew Contest	Door Prizes
Build-a-thon	Discounted Hotel Rooms
Banquet	Complimentary Breakfast
Seminars	Hamvention just across town
Meet the Speakers	Nearby Restaurants
Vendor Displays	New Product Announcements
Discounted QRP Products	Spouse Program

This is preliminary information. Some changes will most definitely occur.
Please check the web site, www.qrparci.org, for the latest details and registration information.

12.08.2008

FDIM XIV 2009

FDIM — Four Days in May

May 14-17, 2009

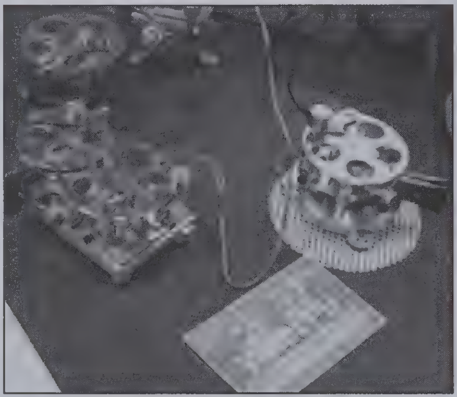
The Premier North American QRP event of the year!

Get it on your calendar now!
Thursday-Sunday, May 14-17

If you haven't attended FDIM before, this is the year to make it your first. QRP-ARCI is sensitive to the first time attendee and will try hard to make your first FDIM as fun and interesting as possible. We will also have spouse/guest activities.

Registration and getting acquainted begins on Wednesday evening. Seminars are most of the day Thursday, with "meet the speakers" and an open room for some casual show and tell, vendor displays and plenty of time to swap tales that evening. We will also host a Build-a-thon Early Thursday Evening. Most of Friday daytime is open to attend the Hamvention® and visit the QRP-ARCI Toy Store. This year we will open the Banquet for Vendors and some other learning experiences. Friday evening activities usually include "show and tell," vendor displays and maybe a judged home brew contest. Most of Saturday is again open for the Hamvention, and we have a great social event, our annual banquet and awards presentation. There will be plenty of door prizes that evening. Sunday is more Hamvention, and check-out.

Most of the speakers for the seminar have been contacted and confirmed. We'll have a "meet the speakers" social gathering after the seminar, where you'll have an opportunity to meet, question and discuss QRP with the speakers.



Don't miss out on the show and tell. You'll have an opportunity to bring out your QRP related projects and put them on display. Your contemporaries will have a chance to roam through the displays and see the excellent craftsmanship used in these special exhibits. We'll have a build-a-thon for a QRP project, a judged project contest and it shouldn't surprise you to find a contest or two during the weekend. We've had QLF, split paddle, and other fun activities in the past.

QRP related Vendors are invited to exhibit both Thursday and Friday evenings. We're sure you'll find many special FDIM discounts.

In the past, the hotel has been accommodating with discount meal tickets. You'll find fast food restaurants across the street from the hotel.

This is preliminary information. A complete schedule and list of activities will be posted on the web site as we move through the process.
Dress is casual for all events.

We will again be at the Holiday Inn, Fairborn, OH. Reservations and special room rates for FDIM will be available after the first of the year through www.QRPARCI.org. Remember, all discounted hotel rooms are released only through QRP-ARCI. Instructions will be posted as soon as the Hotel is ready to start processing our Room Block.

Questions or comments:

Norm Schklar, WA4ZXV
FDIM2008 Chair
fdim@qrparci.org,
Tel: 770-313-9410

FDIM
XIV
2009

What a great lineup of speakers for 2009! You'll hear everything from operating in Russia to how to make better use of that test equipment sitting on the shelf to a good bit of QRP related humor. If you have not attended before, this is the year. If you're a regular, this is another great one. See You There!

FDIM 2009 Seminar Speakers

Rev George Dobbs, G3RJV	**Yet More QRP**
Oleg Borodin, RV3GM	**QRP in Russia**
Chuck Adams, K7QO	**Use of Oscilloscopes***
Ed Hare, W1RFI	**Test Equipment & Methods****
Dave Cripe, NM0S	**Class E Amps for QRP**
Roger D. Hayward, KA7EXM	**(Topic to be announced)**

*Chuck Adams' talk will include digital oscilloscopes.

**As used by the ARRL Lab for Product Review testing, with an emphasis on how hams can do some of the testing with less-expensive test equipment.

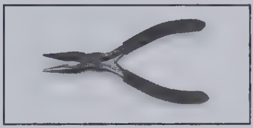
Registration is available through http://www.fdim.qrparci.org. Registration form is also included on page 15.

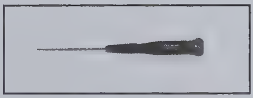
BUILD-A-THON at FDIM 2009

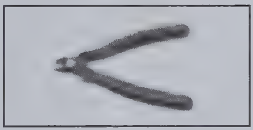
The Build-a-thon is now an integral part of FDIM. Feedback on past Buildathons has been extremely positive. We have conducted the buildathon on either Thursday after the seminar as well as Friday afternoon. The preference for the event is split evenly between Thursday and Friday. The past two years we have held it on Friday. This year, we will return to Thursday after the seminar or roughly 4:30 PM to 8:00 PM on Thursday, May 14, 2009.

In past years, both QRP vendors and QRP Clubs have hosted this event. This year's Buildathon will be hosted by both the GQRP Club and the QRP ARCI. The project this year is for beginners and will focus on the theme of building basic skills. Participants will learn basic soldering (through hole and SMD), torroid winding, component removal and the use of some basic test equipment. When you finish, you will have a VXO controlled 40 meter direct conversion receiver.

Past years' participants found many uses for Buildathon projects. This year's project is an equally useful as it will give beginners a chance to build and use a simple radio.







The Build-a-thon will be held on Thursday, May 14, 2009 from 4:30 PM EDT to approximately 8 PM EDT. Registration for the event is $30.00. This will include all the parts for the project and Elmering as needed. We may ask some of you to bring wire cutters, a needle nose and a small iron to help with the assembly. This will be based in part by whether you are flying or driving to the event.

To register, please check buildathon on the FDIM 2009 registration form and follow mailing instructions on the form. You will receive confirmation of your spot in the Buildathon. Or you may register online at the www.fdim.qrparci.org by following the links to FDIM 2009, and filling out the electronic registration for FDIM 2009 and checking "Build-a-thon."

There are a limited number of seats for this, so please register early. First come, first served. For more information, see:

http://www.fdim.qrparci.org
Or contact Ken,W4DU at: w4du@bellsouth.net

Information subject to change

FDIM 2009 Vendor Nights / Sponsor Sign-up Form May 14-17 2009

Registration is available on-line http://www.qrparci.org (preferred method)

This form is provide for those cases where on-line registration is restricted

Date completed: ____________________

PLEASE PRINT LEGIBLY (Your Table Sign will reflect your writing)

Table Name (Company or Club): ____________________

Contact Info:

Your Name: ____________________ Callsign: ____________________

Email: ____________________ Telephone: ____________________

I plan to exhibit on: | ☐Thursday Evening | ☐Friday Evening (Please check)

Sponsor but **no Exhibit Space is Required** (check here) ☐

Electricity is required: Y/N ☐ Number of Tables Requested: ☐

Tables are somewhat limited, we'll do the best we can if you need more than 1

I will be donating a door prize: Y/N ☐

Door Prize contributions will get you listed as a Sponsor

Brief description of donation: ____________________

Estimated Value $: ____________________

Information for your listing on the QRP-ARCI web site as a Vendor / Sponsor

Web Site: ____________________

Advertised Address: ____________________

Advertised Phone: ____________________

Advertised Email: ____________________

Link to Logo: ____________________

Link to standard banner (468x60): ____________________

Product Line Description Short Paragraph:

Questions or comments to Norman Schklar, WA4ZXV, norman@schklar.com or 770-840-9664

Donated items that need to be shipped prior to the week before FDIM should be sent to:
FDIM C/O Norman Schklar 480 N. Peachtree Street, Norcross, GA 30071 No Later than May 3, 2008

Items sent to the hotel should arrive no sooner than May 9, 2009 and should be shipped to:
Holiday Inn ATTN:FDIM Chairperson, 2800 Presidential Dr., Fairborn, OH 45324

FDIM 2009 Registration Form

Registration is available on-line at http://www.qrparci.org (preferred method).
This form is provided for those instances where on-line registration is inconvenient.

1. Fill in the form
2. Mail Payment to: Jack Nelson, 1540 Stonehaven, Cumming, GA 30040 USA Make check payable to: QRP ARCI

PLEASE PRINT LEGIBLY (Your Badge will reflect your writing)

Your Name: First or Given ________ Last or Family ________

Callsign: ____________________

Email: ____________________

Telephone: ____________________

Seminar QTY __ @$40 = $

Banquet QTY __ @$30 = $

Buildathon QTY __ @$30 = $

Amount Included(includes additional below): $

Day of arrival | Wednesday | Thursday | Friday | Saturday | Don't Know (circle one)

Plan to Stay at | Holiday Inn | Other (circle one)- For hotel reservations please visit rooms.qrparci.org

Do you plan to enter an item in: | Show and Tell |Homebrew| (circle as necessary)

Payment is included with form ☐ (Please check the appropriate box)

Your First FDIM? ☐

Ok to contact me to help at FDIM ☐

Please help with our planning by completing these items.

I plan to participate in the Show and Tell ☐

I plan to participate in the Homebrew Contest ☐

I am interested in spouse activities ☐

Additional Registrants ☐

Name	Callsign or Guest/XYL	Seminar $40.00	Banquet $30.00	Buildathon $30.00
Name: First or Given ________ Last or Family ________		☐	☐	☐
Name: First or Given ________ Last or Family ________		☐	☐	☐
Name: First or Given ________ Last or Family ________		☐	☐	☐

For the latest FDIM information, please visit http://www.fdim.qrparci.org

Questions, please contact Norm, WA4ZXV at fdim@qrparci.org

QRP Clubhouse

Timothy A. Stabler—WB9NLZ wb9nlz@yahoo.com

Greetings from snowy Northwest Indiana. As I write this, it hasn't gotten quite to Thanksgiving yet, but a week ago we had eleven inches of the white stuff. My new house is finally getting framed and when electrical goes in, so does my conduit from basement to attic for my antenna cables. I do not know the subdivision guidelines, so am hoping my dipoles strung in the attic of an all-wood house do okay. I don't know if I mentioned it before, but the new basement will be my shack, office, workroom and whatever else I might need.

I now have an idea of why people might not like doing this column. I sent email out to every group I could think of asking to please send me emails of their club doings using "club doings" as the e-mail title so it did not get trashed by mistake. I only got a couple and they were from individuals, not clubs. I know there are clubs out there I did not contact, so if you belong to a club, please email me with the pertinent information of contact so I can try even more input for club information. If you have any right now, send it along with pictures (and captions please) as I will be writing my next column in about two months (or a little less). To me, this is a reader's column and I need info so I can spread the word about your group and what you are doing. You might just light the spark in some other group for their doings.

Club Activity Notes

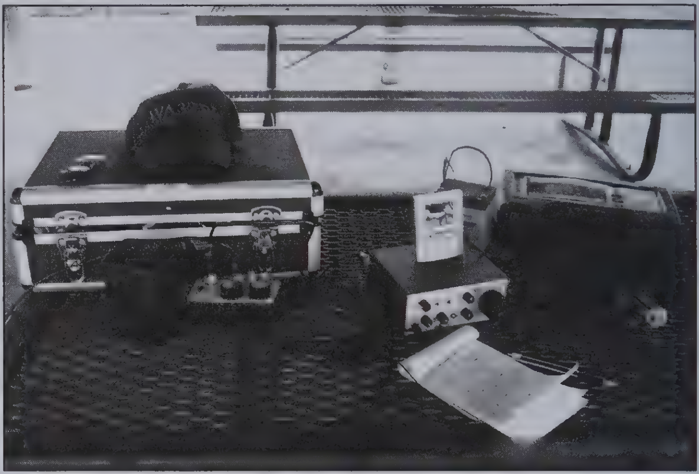
After the November Ft. Wayne hamfest, I wrote Nancy Kott, WZ8C, the editor of *World Radio*, who is also in FISTS, on her not being at the hamfest passing out the latest copy of Chuck Adams, K7QO, code learning CD. She wrote back that they were out of the latest copy and were waiting to see if there would be a newer edition. But she did give me names to contact for inclusion in this column. I found out they were members of the North American QRP CW Club. I went to their website, http://portsys.net/~yoel and found out all sorts of information. If you are not a member, you should probably do likewise. They have a lot going on, a lot of which is written up in their newsletter, which is easily downloaded for printing.

I had a note from Don McBride, WA3ZBJ/4, regarding a recent portable outing of the West Valusia (county) portable group. The outing was held in DeLand, Florida using a 7 AH gel cell powering a wilderness Sierra. An AZqrpScorpions paddle was used along with an Emtech Z1 tuner going to a jumper dipole suspended from a crappie pole.

I had another note from Paul Signorelli with a QSL card of Daniel Scott, W0RW, working pedestrian mobile in the Garden of Gods park in Colorado Springs, CO. He worked over 20 stations with his PRC319 and a 10 foot whip.

Ozarkcon

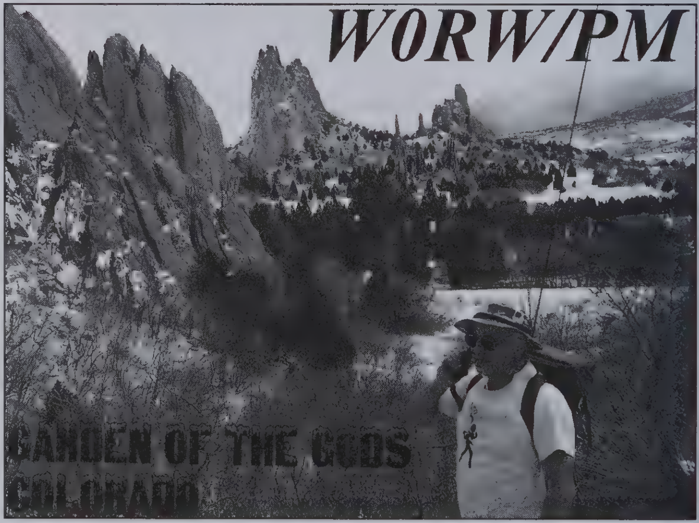
If you are looking for something to do prior to Dayton, there is always Ozarkcon, held in Joplin, MO. It is usually held the last weekend of April and is something I plan for a year in advance. There is a banquet Friday night followed by a kit building session. This year, Dar Piatt, W9HZC, and some of the folks from the Homebrewers group will be leading the building session on a signal injector/tracer and then on Saturday will give a talk on "Now that you have built it, what do you do with it?" Also on Friday night, the vendors get set up with some good buys. Saturday is the presented-talk session. Last year there was a talk on VLF. The last couple issues of *QST* have featured a receiver for this region. Each year the attendees get larger in number. Go online to www.Ozarkcon.com to get details of the meeting. It should be posted sometime in January. One last thing is the jam session each evening. Anyone with an instrument is invited to join in.



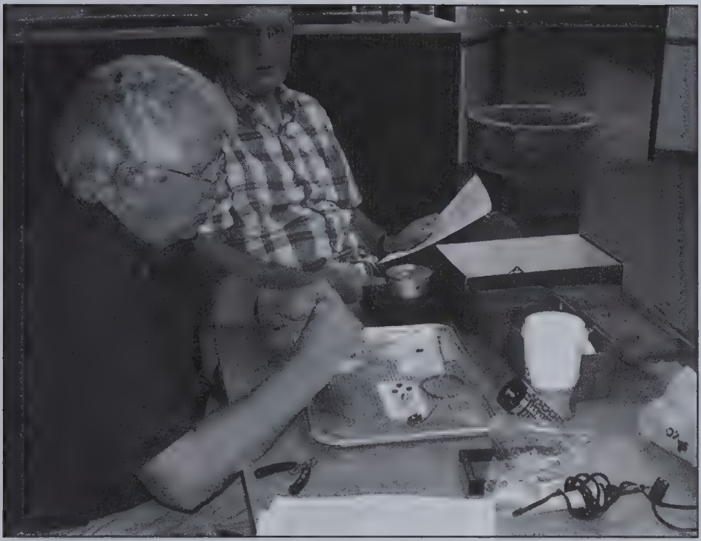
Don McBride's setup for portable outing. In the case is a Hendricks PFR3 transceiver, with paddles.

Michigan QRP Club

This group sends me their quarterly publication, "The 5 Watter." They get together the first Saturday of each month at Walli's Restaurant in Burton, MI. At the October meeting, Jin Kortge, K8IQY, brought in his Norcal 2N2/XX transceiver he designed and built for everyone to see. It is on the market now and



The QSL card for W0RW working pedestrian mobile in Colorado.



Dar, W9HZC, working on the tuner-upper kit at a Homebrewers meeting.

Darrell, KØAWB, setting up his kit building at a Homebrewers meeting.

is available for 20, 30 and 40 meters. The Fall issue had an article about a stabilized VFO/Exciter and an article about a receiver project. Both were very interesting. An application for membership club information sheet can be obtained from the Membership Chairman, Michigan QRP Club, 4391 Clintonville Rd., Waterford, Michigan 48329.

Midwest Homebrewers and QRP Group

The November project for the meeting was the KD1JV digital readout meter. Several were built or started and using squirt solder paste and a heat gun makes them go together quite easily. As I have stated earlier, the main reason for the meeting of the group is to build something and then try it out. The next meeting is January 10 at Breadeaux Pizza in Ashland, NE. On their e-mail site there has been some talk of having more meetings as opposed to their present every other month meeting. More information can be found at their website, http://www.qsl.net/hbqrp. Or you can email Darwin Piatt, W9HZC, at wb9hz@cox.net.

That is it for this column. Please send me information for the next one or get someone else to do it. Thank you. ●●

A normal Homebrewers meeting with everyone working on a project.

Stay on top of QRP ARCI activities, check the QRP-F forum, see the latest contest rumors and results ... and much, much more at:

Outdoor Radio (QRP, of Course)

Jim Cluett—W1PID jim@W1PID.com

Editor's Note—In a great stroke of good fortune, one of our club members stumbled across the web site of a ham who is able to combine our common hobby of ham radio with an obvious love of the outdoors and a talent for showing its beauty. He calls his pastime "outdoor radio" and, as he shows in this article, it can be accomplished any time of the year! Here are just a few of his year-round adventures, starting with a springtime day trip. Perhaps it will inspire you to have some adventures of your own. And, if you would like to see more, check out http://w1pid.com

Because the inside of QQ is printed in black-and-white, it does not show the magnificent scenery in all its glory. To remedy that situation, we feature several of the most attractive photos on the front cover, and on the inside back cover, where we can print them in color.

Spring on Knox Mountain

I've been itching to hike to Knox Mountain for weeks... but the snow's been just too deep for my small black lab, Meghan. She'd bite me if she knew I went without her. But today was the day. The trip was absolutely exhilarating, and it was capped with three nice DX contacts with Italy, Serbia and Hungary.

We've had a week of glorious weather in the 60s. Even though there are spots with two feet of snow in the woods, I thought I'd take a chance that the trail was passable. We started the hike around 3:00 in the afternoon.

Less than a quarter of a mile from the dirt road, this bridge spans the brook. It was so great to hike across it again. The roar of spring runoff made Meg and I feel giddy.

The trail was mostly dry. But here and there, along the way, we ran into wet spots, or places where the snow ran deep. But that snow had a few advantages. It provided clues to the wildlife who also used the trail. Giant moose tracks crossed at several places. There were plenty of deer tracks too. At one place we investigated a coyote scat replete with animal hair. For a mile or so the brook runs close to the trail.

The walk in takes about 40 minutes. Ninety percent of the way was clear and dry. Just before the last bridge we hit a snow patch 50 feet long and a couple of feet deep. I cautiously tamped the snow down with my shoes before putting my weight down so I wouldn't crash shin-deep into the remnants of winter. Shortly after crossing that bridge the cabin came into view.

And what a great sight! Like an old friend. There was some snow on the back side in the field, but the front was warm and dry. I tossed a water bottle into a nearby tree to put up the 20 meter Par End-Fedz half wave wire. I got it with one throw. In a few minutes, I was set up on the porch steps with the ATS-3A and ready to go.

My first contact was with Willer, IK2UJS. He was pounding in... way over S9. He gave me a 579 and when I told him I was QRP with 4 watts, he sent back, "UR QRP SIG FB."

He was running 300 watts. I didn't tell him I was watching a mallard swim across the pond in front of me.

The little ATS-3A is a joy to backpack and operate. It only weighs a few ounces. I power it with a 750 mAh LiPo battery.

My second contact was with Atila, YU5RA in Serbia. He was just as strong. I had to pull the earbuds away from my ears, he was so loud. He gave me a 599, and I bet it was an accurate report based on how strong he was. "Nice FB SIG with 4 watts," he sent. We chatted for several minutes, during which I flicked a tick off my leg as it crawled up. (How DO these guys get going so early in the spring?)

Finally I answered HA7LW, Kalman in Hungary. At first he was strong, but he quickly dropped down. So did I. He gave me a 449 and we signed as the band changed.

With this I packed up and headed back toward the dam and the return trail to the car. During the summer, I try to get to Knox Mountain at least once a week. It's a great place to exercise both Meg and the ATS rig. We were back by 4:45.

Camping on Moon Island—June 2008

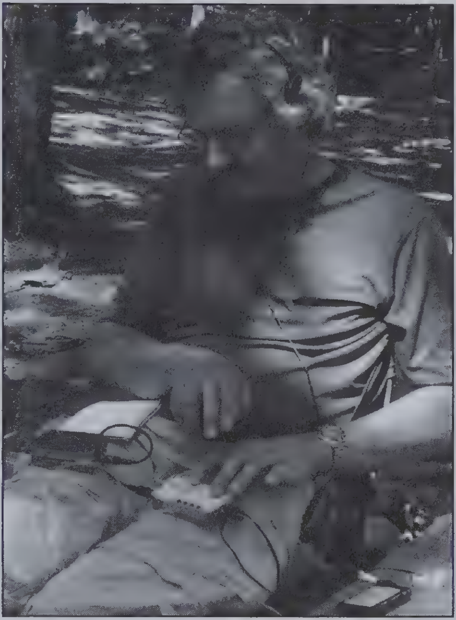
It's been a year since Bill, AB1AV, and I canoed out to Moon Island on Squam Lake. We had such a fantastic time (http://www.w1pid.com/squam/squam.html) we decided to go again. This time it would be an overnight with plenty of time to operate.

Again we brought Bill's beautiful homemade canoe and left from the Squam Lakes Association launching area in Piper Cove. The day was perfect, though a bit windy. There were no clouds and temperatures were in the low 80s.

In the protected bay, the water was smooth. But once out on the lake, it was a different story. A stiff Northwest breeze brought small whitecaps to the lake and made paddling a challenge.

The trip took us slightly more than an hour. The winds gusted to nearly 20 MPH and water splashed into the canoe more than a few times. We arrived shortly before noon and had a quick lunch before putting up antennas.

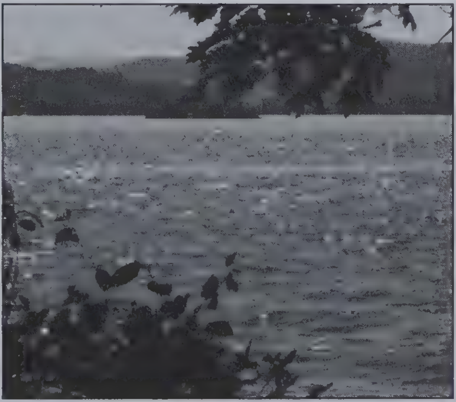
I used a 33 foot vertical tuned with the little Par Electronics end-fedz matchbox. Bill put up an 88 foot speaker-wire dipole. We both used our ATS3 rigs by KD1JV. Bill has a touch-keyer mounted right on the Altoids tin. He looks like a piano maestro with his fingers dancing on the rig.



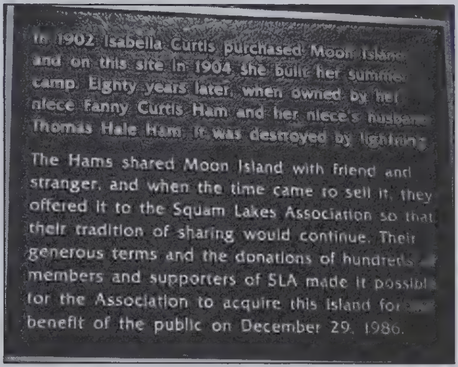
Shortly after setting up, Bill worked VE3VJC near Toronto on 20 meters. "He says I'm pounding in," Bill called over to me. Bill then switched to 40 meters and made contacts with KI4XH in VA and W9JOB in VA.

The bands were distinctly quiet, but I made several stateside contacts on 20 meters. First I worked N5XM in Arkansas. Rick was a 579 and gave me a 569. As soon as I finished the QSO, W4DF called from VA. "Amazing QRP sig," Fred sent. "UR 4 watts doing real job." I got a call from another VA station, K4JJQ. "UR booming into Northern VA," sent Jack and we chatted for 10 minutes. Then I worked another QRPer. Dale KO8L in Cleveland was a 579 and he gave me the same report. We chatted for nearly 20 minutes. He was running 5 watts with a loop. Afterwards Bill worked him too.

It got slack so we took a break to walk around the island. The views were super.



Bill, who was ahead of me, shouted back to me. "Jim," he called..."The Hams shared Moon Island with friends and strangers!" Huh? I followed him around the trail to an old foundation where he pointed to a plaque.



In 1902 Isabella Curtis purchased Moon Island and on this site in 1904 she built her summer camp. Eighty years later, when owned by her niece Fanny Curtis Ham and her niece's husband Thomas Hale Ham, it was destroyed by lightning.

The Hams shared Moon Island with friend and stranger, and when the time came to sell it, they offered it to the Squam Lakes Association so that their tradition of sharing would continue. Their generous terms and the donations of hundreds members and supporters of SLA made it possibl for the Association to acquire this island for benefit of the public on December 29, 1986.

Little did we know there was a long history of Hams right here on Moon Island. I hammed it up for the camera in front of the old foundation. The plaque lies on the ground on the right front part of the photo.

When I sat down again to operate, it was later in the afternoon and DX started showing up. I made a quick contact with ON4ATW in Belgium. I was only a 449 there. Shortly after that I worked RX6AMV in Russia. Nick gave me a 569.

A highlight of the trip was working Carter, N3AO from VA. He called Bill on 40 meters in the early evening. Bill gave Carter some details of our setup and chatted for a while before I took the key to say hello to my old friend. What a thrill to work him. I signed: AB1AV/P/QRP/JIM/FUN.

As evening approached we got ready for the VT-NH CW net on 80 meters. Bill used his 88 foot dipole and I set up a low dipole with no feedline and tuned with the Elecraft T-1. I strung my wires about 4 feet high over low branches. Bill and I sat facing each other when we checked into the net. W1ZPB in Massachusetts said we were peaking about an S7.

During the day the winds held the mosquito hordes at bay. But toward evening the wind died down, and we put on our long sleeves and DEET. Early evening on the lake with the loons calling back and forth is a pure joy.

The forecast called for a cool night dropping into the 40s. But the lake moderated temperatures and it didn't drop below 50... perfect for a good night's sleep.

The mosquitoes were as hungry as we were at breakfast. So after a cup of tea and some oatmeal, we decided to pack up. The trip back on smooth water only took a half hour. But the overnight left us with enough memories to last until our next visit.

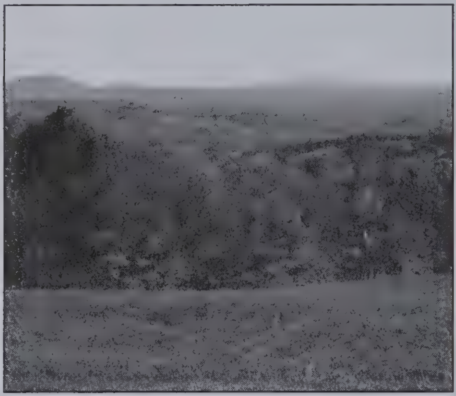
Fall QSO Party—2008

Sunday, Oct 19, 2008—It's a perfect fall day, and I'm hiking up a range road near David Swain's farm in Sanbornton. The sun is brilliant, and the trees are alive with radiant gold and orange. The woods are aflame with light and color.

I turn right into an upper field and walk through lush pasture heading uphill. There is a line of color along both the North and East sides of the field so remarkable it takes my breath away. Brilliant reds, yellows and oranges contrast with a deep blue sky.

I put up a 44 foot dipole between the branches of two flaming maple trees. I'm feeding the antenna with 300 ohm ribbon. The trees are so magnificent that my antenna tree radiates all by itself.

I've brought the ATS-2 and a ZM-2 tuner. Right away I hear Bob N4BP calling CQ on 20 meters. We say hello and complete the contest exchange. Within the next half hour I work W4SEC in Florida, WØRSP in South Dakota and a couple of stations in the Illinois QSO party. I look up between "overs" to catch a glimpse of the view of the Belknap range to the South.



During the contest I worked nearly 20 stations, but only five of them are from this site. Most of the activity seemed to be later in the evening on Sunday just before the event ended. I made 10 of the contacts on 80 meters.

Already the evenings are getting cold... into the mid-20s. Within the next week the leaves will disappear. The winter is long in New Hampshire. These brilliant days soften the blow.

Monday, October 20, 2008—This afternoon I hiked again to Knox Mountain. Everything here is different. The leaves have mostly fallen leaving a rich pathway of vibrant color. Only the beech tree leaves are left. They range from bright yellow to ochre and red. They are seemingly self-luminous and brighten the forest.

I cross the brook. It's filled with ribbons of gold and clear, see-through to the bottom, pools. It was here that I encountered a bear only three weeks ago. I was hiking back from the cabin. He was 30 yards ahead of me. I was uncertain of what to do. I thought if he heard me, he would run away, so I said, "Hello Bear!" in a loud voice. He stood on his hind legs and stretched his arms toward me. He was huge... considerably taller than I. So I turned and walked away. I looked back when I heard him crashing through the woods. He was running away from me... going much faster than a dog could ever run.

At the cabin today I put up a 30 foot vertical wire and tuned it with the ZM-2. I had brought the ATS-2. First I worked Jan, EA8/DL5JAN. He was a 599 and gave me a 579. "UR 4W FB S7," he sent. We QSOed for five minutes. Then I worked KØARS/m in MO followed by W5JBV in Florida. DJ2QV, Mike in Munich, gave me a 449. Finally I worked Jurek, EA6UN in the Balaeric Islands. He gave me a 579 and sent, "FB 4W QRP Jim FB JOB." With that I packed up. The cabin is a wonderful place. Warm on the porch... even on cold days. Rich with nature and color. Today I saw moose tracks on the trail going home.

Hermit Lake in January

For the last two days I've gone out onto Hermit Lake in Sanbornton to try some winter operating. There's been a bit of a warm spell... it's been in the mid 30s, with some sunshine to keep the fingers warm. On Monday I worked Germany, Spain and California. On Tuesday I worked Seattle and Madeira Islands.

Hermit Lake is dotted with islands, and in the winter, a few bob houses for ice fishing. Snowmobilers maintain several thoroughfares which traverse the lake. But, it's not a busy place. On the two days I went out, I didn't see anyone. I often cross-country ski here, but for my radio adventure I decided to walk out.

I set up on the south side of a small island. It offers a bit of a wind break and of course some necessary trees for an antenna. I bring a lightweight stool to keep my butt off the snow. In the winter my pack consists of an FT-817 with everything pre-connected. Taking things out of the pack and connecting gear just means cold hands. So batteries, key, and antenna are all ready. And... the FT-817 has a speaker so I don't need earphones. All I have to do is throw up a wire, setup the stool, and I'm ready to go. I usually use a T-1 tuner and a half wave wire. But I just got a Par Electronics end-fed that has a little matchbox. It's incredibly small, light. I have a 33 foot wire on it and the SWR meter shows a perfect match.

On Monday I operated for 15 minutes.

20 meters sounded good. Right away I worked a German station. Arno, DN6SA, gave me a 449. It was a quick exchange. Then I worked Vic in Spain, EA5KV. He gave me a 529. Before quitting, I worked K6TLL in California. Jim gave me a 559, but I don't think he really copied me that well, because he asked for some repeats.

I went back to the same spot the following day. There weren't as many signals on the band, but the ones that were there were stronger. I worked Steve W7QC near Seattle. Steve wasn't all that strong at first, only 559 and I was a little surprised he came back to me. He gave me a 449, but I know he copied me better than that because we chatted for 10 minutes. And he was getting it all and asked if I were going to do any ice fishing. Steve was running a K3 and a 3-element beam, and he wanted all the details of my setup.

Then I worked CT3FT on Madeira Islands off the coast of North Africa. Cedric was a strong 599 and he gave me 579. He was running 500 watts with a 4 element beam.

With that I packed everything up. Now that February is almost here, there should be more days in the 30s and 40s with the sun getting higher and warmer. With broad vistas, views of distant mountains and plenty of south facing islands, Hermit Lake is a great spot for winter radio. I'll be back before the ice melts. Thanks to everyone for the great contacts!

—73, Jim, W1PID

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BE SURE TO SEE FULL-COLOR PHOTOS ON THE INSIDE BACK COVER OF THIS ISSUE!

The Mystique of QRP

Dick Arnold—AF8X af8x@comcast.net

When I was first licensed in 1978, I was so enamored with radio in general and CW in particular, every waking moment I either thought about amateur radio or talked about it.

Conditions were wonderful and getting better. It was no problem to work anywhere in the world with 100 watts. I made many, many contacts during the next several years. I had schedules with hams around the world and propagation was such that we rarely missed connections. About that time I found myself becoming bored with HF operation, making contacts seemed as easy as making a phone call; the magic was gone.

I got interested in a new technology: Computers. Home computers were just hitting the market. I had a couple of the early models and quickly became a "quiet key."

For several years I only dusted my station equipment and very rarely turned it on to see if I could still copy CW. Then it happened… I was looking through a friend's radio magazine when I saw an article about QRP. It was kind of interesting that most of the QRP equipment was home-brewed. The only kits at the time were Heathkits. I was mildly interested, but the low cost and the ability to work portable without a ton of equipment needed, really intrigued me.

As I thought about and read accounts of QRP operation, I knew I needed to get into this mode. I sold all my station equipment and recycled the money into QRP related equipment. I was amazed that I could make contacts around the world using only 5 watts. I often got up before sunrise and worked Australia or New Zealand on 40 meters using 5 watts to an inverted-vee antenna. Alas, those days are over now that the solar cycle is near the bottom, but at the time things couldn't be better for QRPers.

If you are bored with your present operation, give QRP a try. QRP is 5-watts out on CW or 10-watts SSB, with CW being the more effective mode especially now when conditions are not great. If you have tried QRP and are not impressed because of a lack of success when either calling CQ or answering CQs, try operating near the end of a contest when the operators are desperate for new contacts. You will be surprised at how well they can hear you during that time.

If you are still a bit skeptical about low power capability, here is something that is the "proof of the pudding." I built a QRPp (less than 1-watt) transceiver kit with an output of 80 mW. The first contact with that rig was New York and a second station in Seattle Washington broke in and gave me a signal report too. After using this and other QRPp rigs I built running less than 1-watt, I went back to my 5 watt rig and it seemed like I was running a kW; I rarely missed making a contact.

After years of operating with some of the QRP rigs on the market, I saw an ad for the Elecraft K1. I purchased and built the kit and it immediately became my favorite rig, until… The KX1, another kit by Elecraft which my XYL was kind enough to buy as a Christmas gift for me.

The only thing I crave now is some warm weather so I can go out and play.

—72, de AF8X

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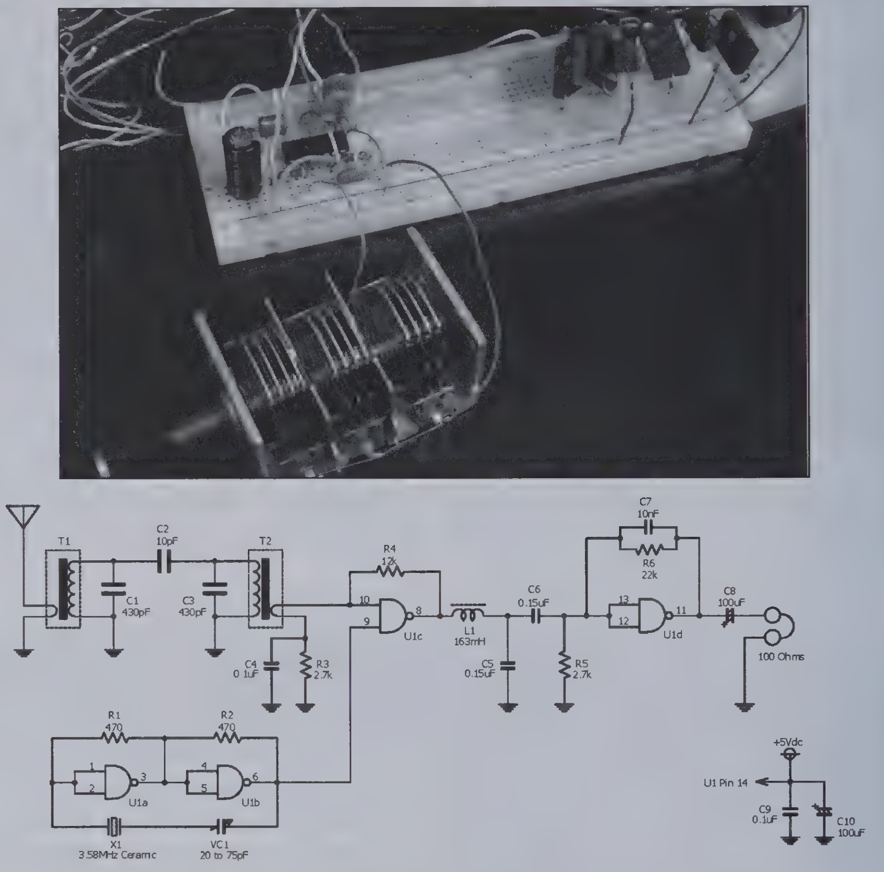
[But as the previous story shows, you don't really need warm weather to go out and play QRP! —Editor]

Minimalist Radio—Adventures in Homebrewing

Michael J. Rainey—AA1TJ
mjrainey@gmail.com

Editor's Note: This article was derived from the web pages of AA1TJ, http://mjrainey.googlepages.com/radio. Those pages describe some fascinating receivers, transmitters, and a few transceivers. In all cases, the circuitry is unusual and typically contains a very minimal number of components. In keeping with the true traditions of QRP, transmitter power is kept very low in many instances, resulting in some amazing miles/watt figures. Perhaps this article will give some of our readers a design idea or two. It should give all of our readers some food for thought.



T1: 10mm, shielded "IF can," 16-turn main winding, 3.5 to 6uH; 1-turn coupling
T2; Ditto above, except 6-turn coupling
U1; Basic 7400 TTL Quad NAND (not 74S00, 74LS00, 74HC00, etc.)
Ground U1 Pin 7
Measured bias voltages; U1-pin 10 ~1.17Vdc, U1-pins 12/13 ~1.45Vdc
U1d output impedance ~100 Ohms; use transformer matching for other headphone impedances

Figure 1—Schematic and photo of the 80 meter TTL-based receiver.

I seem to have a penchant for low power radios using a minimal number of components. In many cases, these projects were built just to see how they would operate and what could be done with them. All of the ones discussed here have been successful, in that they have been used in actual QSOs, or actual reception of signals in the case of receivers.

80m TTL Direct Conversion Receiver

This simple receiver, shown in Figure 1, is constructed around a single 7400, Quad-NAND gate, TTL integrated circuit as the only active component. If you try it, please don't substitute 74S00, 74LS00, 74HC00, etc., for U1 in this circuit. At a minimum, the biasing would be incorrect for devices other than the "Plain Jane," 7400 IC.

Two of the four gates, U1A and U1B, create a VXO with a square-wave output of sufficient frequency-range to cover most of the 80m CW band. The VXO frequency is controlled by the 3.58 MHz ceramic resonator and variable capacitor VC1.

The third gate functions as a linear RF amplifier which is enabled or disabled by the VXO signal on U1-pin 9. This switching action creates a simple product detector. Resistors R3 and R4 set the proper bias for linear operation of the enabled amplifier. L1, C5 and C6 comprise an impedance matching network having a "peaked" low-pass characteristic. This provides a measure of AF bandpass filtering.

The fourth gate acts as a linear AF amplifier. R5 and R6 produce the DC bias needed for linear operation. C7 rolls-off the amplifier response at high frequencies. Of course, it's possible to use an input bandpass filter other than the one shown in the schematic. The mixer input impedance is approximately 1200 ohms.

Some oscillator leakage is to be expected using this type of mixer. I measured 6 uW of leakage into a 50 ohm resistor connected to the antenna terminals. Also, I wouldn't advise using this circuit at 40m; I suspect the SWBC bleed-through would be objectionable.

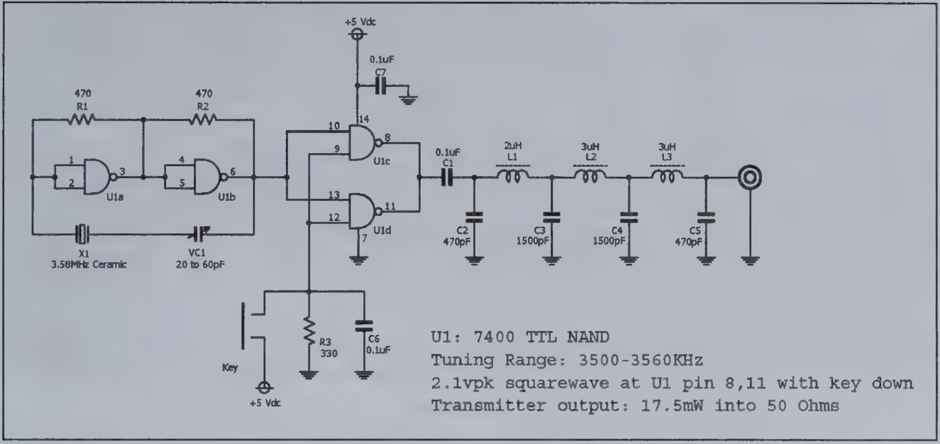
On my first night (April 2, 2008) using this receiver I was pleased to have worked Michel, F5IN, as well as Pat, K0PC. Michel was my first transatlantic DX contact in over 30 years. A few days later I had a message from Pat, saying that he'd looked through his Novice logbook and discovered that we'd met before on the air. On January 3, 1971, Pat (then, WN0ZSF) and I (then, WN0DEN) had worked each other on 40m. I'd been using my Ameco AC-1 and Realistic DX-120 station.

The Vermont Snowflake , an 80 Meter QRPp Transmitter

"That man is richest whose pleasures are the cheapest." —Thoreau

If you have a receiver built around a single 7400 Quad NAND Gate IC, then it's obvious that you need a companion transmitter. The Snowflake is that transmitter, with the schematic in Figure 2.

Two gates comprise the VXO, as with the companion receiver, and the other two



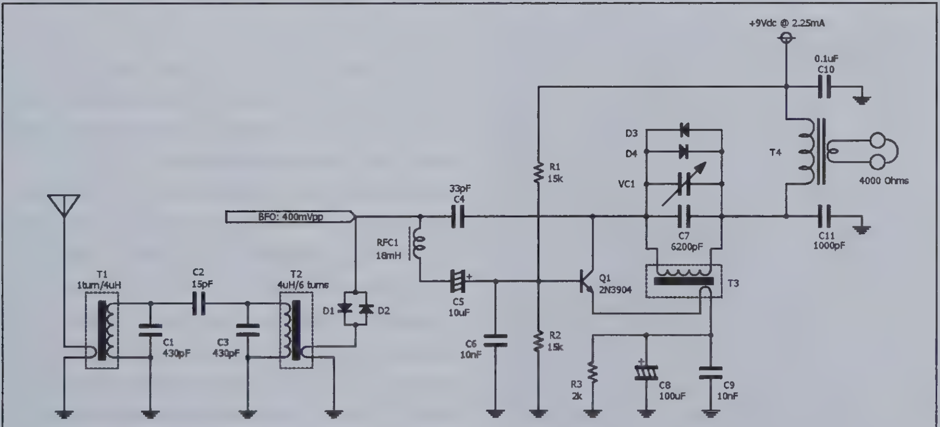
U1: 7400 TTL NAND
Tuning Range: 3500-3560KHz
2.1vpk squarewave at U1 pin 8,11 with key down
Transmitter output: 17.5mW into 50 Ohms

Figure 2—Vermont Snowflake schematic diagram.

Date	Station	RST S/R	His QTH	Km/Mi.	Mi./Watt	Comments
11/28/07	W1FZY	559/449	Athol, MA	169/105	6,000	Solid QSO. 10 minutes.
	KA1JNB	589/559	Westport, MA	305/190	10,857	Lost me.
11/29/07	WA3MIX	559/559	Williamsport, PA	466/289	16,514	Solid QSO. 15 minutes.
	AA4XX	559/219	Raleigh, NC	1051/653	37,314	Sked - heard my call.
	K8JPM/M	579/???	Akron, OH	776/482	27,542	Returned my call.
11/30/07	WA3SLN	599/449	Montoursville, PA	448/278	15,885	Solid QSO. 15 minutes.
12/13/07	W3DP	589/339	Camp Hill, PA	547/340	19,457	"FB on 17mW."
	VE1QY	449/339	Kentville, NS	656/407	23,257	VE1QY power 1 watt
	NM3B	589/449	St. Mary's PA	547/340	19,428	S7 peaks. 30 minutes.
12/20/07	KA1FFO	459/339	Severn, MD	635/395	22,571	
12/27/07	W3MC	579/439	Severn, MD	635/395	22,571	KX-1, 4 watts. QRM.
	N2UC	589/559	Ithaca, NY	221/138	7,874	15 minutes.
12/30/07	K1LGQ	589/569	Brookline, NH	172/107	6,114	20 minutes.
12/31/07	VE2CLC	599/???	Montcerf, QC	375/233	13,314	

Figure 3—AA1TJ Log for QSOs with the Vermont Snowflake.

gates are connected in parallel to form the power amplifier. A 3.58 MHz ceramic resonator is used in the VXO circuit. All of the components in the above photo had been removed from various other equipment. The 20-60 pF variable capacitor (labeled "VC1" in the schematic and seen in the above photo) allows the transmitter to tune from 3500 to 3560 kHz.



T1: 10mm, shielded, "IF can," 3.5 to 6uH adjustable; 1-turn primary winding
T2: Ditto above, except 6-turn secondary winding
T3: T50-68 ferrite core; 1.36uH, 9 turn primary; 6 turn "emitter" coupling
T4: Audio transformer; 24k:4k
VC1: 15 to 420pF variable; BFO tunes 1745 to 1805kHz
D1,D2: 1N34A Germanium diodes (preferably matched)
D3,D4: 1N914 Silicon signal diodes
Q1 base: 4.5Vdc, Q1 emitter: 3.9Vdc, Q1 collector: 7.5Vdc

Figure 4—Schematic of a one-transistor receiver.

If you build this circuit into an enclosure, be sure to mount the variable capacitor on insulators and use an insulated shaft between the front-panel knob and the rotor as both side of the variable capacitor are "hot" with RF. Of course, a quartz crystal may be substituted for the ceramic resonator for fixed-frequency operation.

Figure 3 contains excerpts from the contact log of the Snowflake working into an end-fed, 80m, half-wave antenna. In each case, an output power of 17.5 mW was used from start to finish.

80 Meter Direct Conversion Receiver

Of their MicroR1, three transistor, direct conversion receiver design, Hayward, Campbell and Larkin comment (EMRFD, page 8.4), "The challenges inherent in simple equipment are not necessarily disadvantages—it takes more skill to cross a harbor in a sailing dinghy than a motor boat. Copying signals from across the oceans with a three transistor circuit is similarly rewarding."

The design shown in Figure 4 is a somewhat greater challenge. It shows an 80m direct conversion receiver that uses only one active device. A 2N3904 transistor serves as both a high-gain AF amplifier and the local oscillator; and yet both the receiver sensitivity and audio volume are surprisingly good. For example, on the first night of listening I copied OZ4UN's 10W CW signal from Denmark. In fact, it's possible to lay the headphones on the bench and copy stronger signals quite easily.

A sub-harmonic (Polyakov) mixer follows the two-resonator 80m input bandpass filter. The AF amplifier is a standard common-emitter configuration. Transformer T4 steps-up the headphone impedance to provide a fairly high collector load impedance. This, together with the decoupled emitter resistor and just under two milliamperes of quiescent emitter current helps to produce a single-stage voltage gain of just over two-hundred.

This same transistor operates simultaneously as a common-base HF oscillator. The paràllel LC tank at the collector is resonant at one-half the receiver working frequency. The sub-harmonic mixer requires an oscillator signal amplitude in the range of 300 to 400 mV_{pp}.

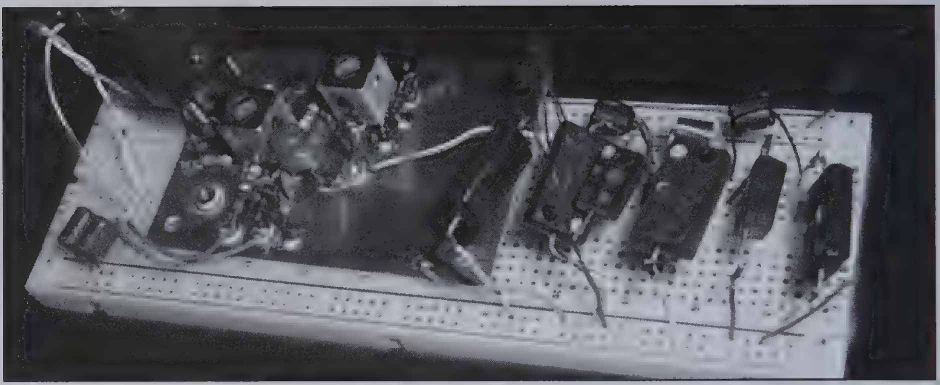
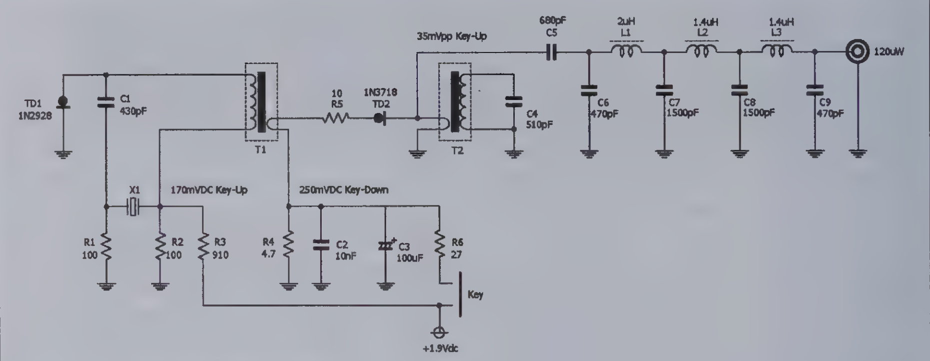


Figure 5—Synchrony tunnel diode transmitter.



TD1: 1mA peak-current tunnel diode

TD2: 10mA peak-current tunnel diode

T1: 10mm, "IF Can," 16 turn inductor, 3.5 to 6uH, 2-turn secondary wound with #32 wire

T2: Ditto above, with 4-turn primary winding of #32 wire

Adj. T1 for >35mVpp at TD2. Press key and adjust T2 until TD2 frequency snaps into synchronization with exciter

Switch-off 1.9Vdc supply at R3 while receiving

Figure 6—Synchrony schematic diagram.

The oscillator level amplitude is clamped to 1.2 V_{pp} at the collector using silicon diodes D3 and D4. While it's entirely possible to substitute different inductors for the devices that I've used, it's important to preserve the low oscillator L/C ratio and degree of feedback coupling indicated on the schematic diagram. This oscillator is a bit different than most, inasmuch as it must remain at all times within the bounds of Class-A operation. The overall loop-gain ought to be high enough to provide reliable starting, but not so large as to "slam" the oscillator waveform into the diode clamps; a situation that would create excessive harmonic energy. Ideally, we want a "soft" oscillation to gently rise until it begins to feel a tickle of nonlinearity from the diode clamps. The values shown in the schematic produced a clean and steady sinusoidal waveform at the transistor's collector. If the oscillator does not immediately start, please insure the phasing is correct by swapping the emitter feedback winding connections on T3.

The frequency vs. temperature stability improved considerably by replacing the ferrite-core oscillator inductor with an air-core device.

During March of 2008, I've used this receiver to make more than a dozen contacts on 80m. Most of the contacts were made using a one-transistor (2N697) transmitter with 250 mW output. One afternoon I continued to have a solid copy (S4-5) of Jim, W1PID's, signal after he'd reduced his output power to ~100 mW.

Synchrony—A Tunnel Diode Transmitter for 80 Meters

Figure 5 is my two-stage tunnel diode transmitter. The schematic is shown in Figure 6.

After working out this design, it's now clear to me why nearly all of the 1960s tunnel diode novelty transmitters were designed for phone rather than CW. Trying to keep a tunnel diode oscillator frequency-locked to a quartz crystal—while drawing staccato power from it—is akin to balancing a pea on your knife while jumping on a pogo stick!

The problem is associated with the nature of non-linear oscillators in general. That is, the bias required for a reasonable output power in a keyed oscillator is higher than the bias needed for reliable frequency-locking to a quartz crystal; the circuit exhibits hysteresis.

My solution to this problem is to employ a two-stage transmitter. The crystal-controlled exciter oscillates continuously under a light load. A small sample of the exciter energy is required to reliably synchronize the keyed, higher-power, heavily-loaded, LC oscillator to the exciter operating frequency. This circuit resembles a classic, master-oscillator-power-amplifier (or MOPA) transmitter. However, it's more accurately described as a master-oscillator, synchronized power oscillator circuit—thus, the name "Synchrony."

I made a number of contacts with my Synchrony transmitter over the course of the first few months of 2008. All of my QSOs were with Seab, AA1MY, who has shown an amazing ability to pull my weak signal out of the noise. He uses an IC706-IIG and a homebrew tuner. Ladder-line drives a center fed, 176 foot inverted-vee antenna with the center located at a height of 50 feet. And of course, with all QRP contacts, more than half the credit goes to the person receiving these low power signals.

On January 15, 2008, we made a QSO of note, commemorating the 50th anniversary of Leo Esaki's paper that first described the tunnel diode.

During the course of these QSOs with AA1MY, the design of Synchrony evolved. In addition, I designed a companion tunnel diode receiver. And, in February, I used my all-tunnel diode station to complete a QSO with Seab. On February 7, 2008, Seab and I made a QSO with the Synchrony running 95 microwatts, which crossed the threshold of 1,000,000 miles/watt.

I hope you enjoyed this tour of some of my projects. Perhaps it will inspire you to see what you can do in your own workshop!

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QRP World News

Oleg Borodin—RV3GM rv3gm@mail.ru

"Every year is getting shorter
Never seem to find the time.
Plans that either come to naught or
Half a page of scribbled lines..."
—Pink Floyd, "Time"

My first step along the path
(The almost confession of QRPer)

Going through my first SWL log-book, I am amazed for how a long time it was! In 1977, I was 14-year-old schoolboy. I was engaged in the radio operators section of the Lipetsk Young Technician Club and have my SWL call sign UA3-137-12 already. They teach us Morse code, radio communication rules, and prepared us like military radio operators. Also, we trained at our club station, UK3GAN. Since I have an SWL call, I visited our regional amateur radio club station UK3GAZ where I have operated a couple tens of QSO already. Moreover, I was awarded by diploma, "The Juvenile Radio Operator" badge (Figure 1) and a nice book for my high Morse code reception results. That book was *The HAM radio handbook* (Figure 2) of Boris Stepanov UW3AX, which I learned by heart and read until it had holes!

At home, I listened on HAM bands using a broadcasting valves radio-gramophone (40m band) (Figure 3) coupled with my home brew, one valve 20m converter. Be sure, I was a very active SWL and my log-book pages were filled up with call signs very fast. I wrote down my log everyone heard station and sent a QSL card almost to all.

I liked to listen to HAM radio evenings very much. I feel myself as a North Pole station radio operator in the mysterious light of a receiver scale. This luminous scale seems to me a window to a large interesting World, where there is kindness and quiet, where the people of any countries and continents greet each other and send best wishes, "73."

July 1 of 1977, the month of the "Sea Of Peace" award has begun. I wanted very much to fulfill this award. In the daytime, I have wrote down the majority of Baltic countries. In evening, I listened on 20m in hope to pick up something new. The new has appeared!

Figure 1—My first radio badge, "The Juvenile Radio Operator" badge.

Through the background of bothersome DL, SP, LZ call signs, one exotic call has sounded in the headphones. That was Ireland EI7H/QRP. The most of Q-codes were known to me, but "QRP" was a new one. Referenced to *The HAM radio handbook* a little bit was explained: "Can you reduce the power?" and "I can reduce the power." After some minutes, the Irish operator announced that his station is only 2 watts output. So I finally made sense of this strange call's addition. Two watts! What such is it?! Just only TWO watts!!! Using such micro power, the Irish station was operating with UA9OBG from Novosibirsk (Figure 4). Amazing!

Figure 2—*The HAM Radio Handbook* by Boris Stepanov, UW3AX.

So, it means that is not necessary to have large and complicated radio to operate on HAM bands, isn't it? Is striking! Those juvenile years I was sure that a HAM radio station must be too large and powerful. Like the old military valve receiver "Mole" with TX-unit at our Club station (400 watts). Or even the R-250 "Whale." Or any extremely beautiful rare transceiver which once I admired in HAM

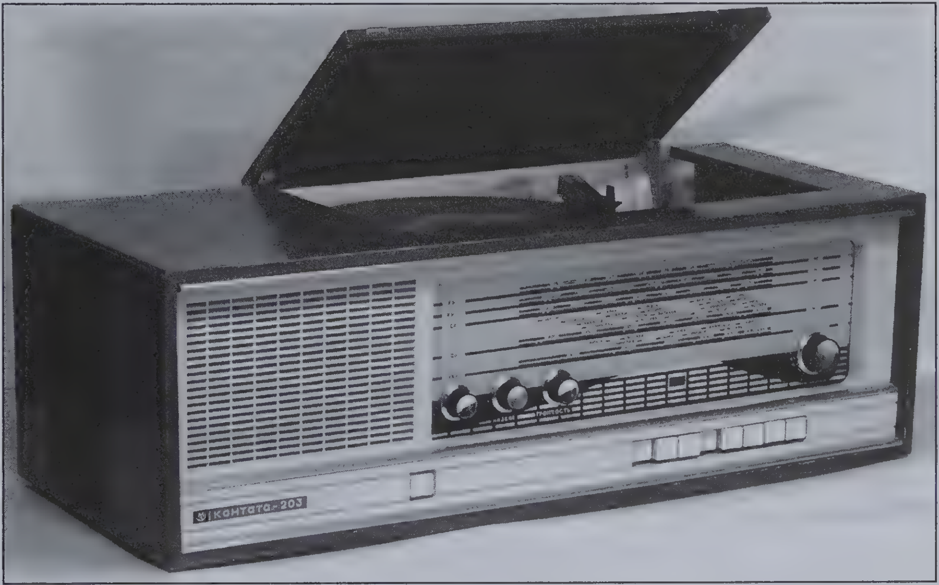

Figure 3—My first receiver, used on 40 meters, and with a one-valve converter for 20 meters.

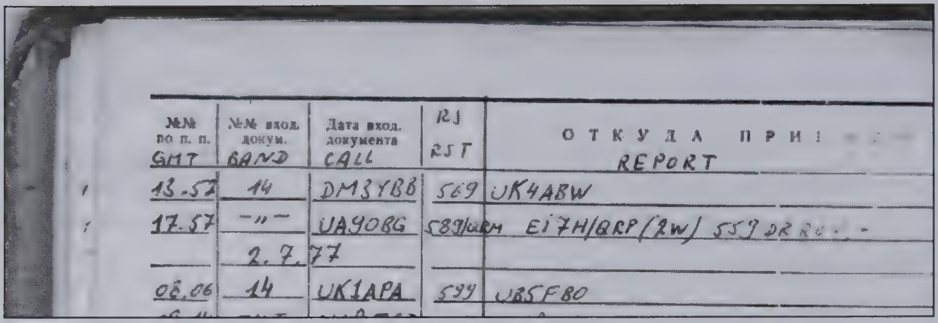

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Figure 4—My SWL logbook with the EI7H/QRP entry that was my first discovery of QRP!

Figure 5—Vlad, RA3AEE holds the 3-transistor direct conversion receiver he designed.

pictures in *The Radio* magazine. For me, a young boy, it seemed an unrealizable treasured dream to obtain real SW receiver. Therefore, in all my school copybooks were outlined many incredibly large and solid radios. I hoped, ones like that will appear for me sometime.

As I now see, every thing can be much easier. It is not necessary to excruciate myself by dreams about inaccessible real HAM receivers or transceivers. In some days in a reading room of the library, where I frequently looked *The Radio* magazines, I began to give my attention to little "QRP news" columns. They were very poor and small notes just in two or three sentences, e.g. "Somebody has contacted with somebody using a simple radio with small power, etc." These notes convinced me that the way to HAM radio is much easier than I thought it earlier. When the schematic of a 3-transistor direct conversion receiver (of Vlad Poliakov, RA3AAE) was found by me, I had no more patience (Figure 5). Urgently the money of RUR1.50 for the VFO transistor was collected. That was large money for schoolboy, so I economized on school dinners over a week. It was impossible to get a pair of rare RF diodes, but I replaced it with cheap silicon diodes in a mixer. Also, I replaced a difficult wound AF choke with simple RC network. The variable capacitor of an old valve BC receiver was successfully used.

Finally, there is the first turn-on of my RX. The headphones and 9 volts battery are connected. Click and … the real CW signals sounds in the headphones! After short tune-up of coils, the 80m band appeared. At once, I have felt the excitement. There are only ten soldered parts on my desktop but I have fine HAM radio sounds in headphones. Why all my teachers told me about difficult and expensive receivers and transceivers?! Such the simplest receiver sounds good as military receiver of our Club station, and I've built it myself in only two evenings!

Since that time, the pictures in my school copybooks became others. The new pictures were any possible versions of the DC receivers and 2-3 transistors transmitters' schemes. Later, the idea to use a RX VFO as the TX oscillator was appeared and the idea of DC transceiver was born. Then, I did not know yet that there are lots of similar designs present, so I feel like a Great Inventor. There is a nice childhood charm in this naïve fallacy!

Certainly, it all was build and re-build in any versions many times. Every thing was tested in HAM bands; multiple and right conclusions were made. No doubt, it is possible to make QSOs using simplest radio, even on 2 transistors.

This was a lot of time ago and… how it was really with me!?!

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Upcoming QRP ARCI Contests:
Mark Your Calendars!

14 March 2009	HF Grid Square Sprint
4 & 5 April 2009	Spring QSO Party
31 May 2009	Hootowl Sprint
27 & 28 June 2009	milliWatt Field Day Contest

A QRP Erector Set

Tom Hall—AK2B tom@portronix.com

There are times when we are experimenting that we would like to have the ham radio equivalent of building blocks or an erector set. The idea being that if we want to try a different circuit in an existing project, we could just pull one out and drop another circuit in. This concept is now a reality thanks to Kits and Parts dot Com (owner Diz, W8DIZ).

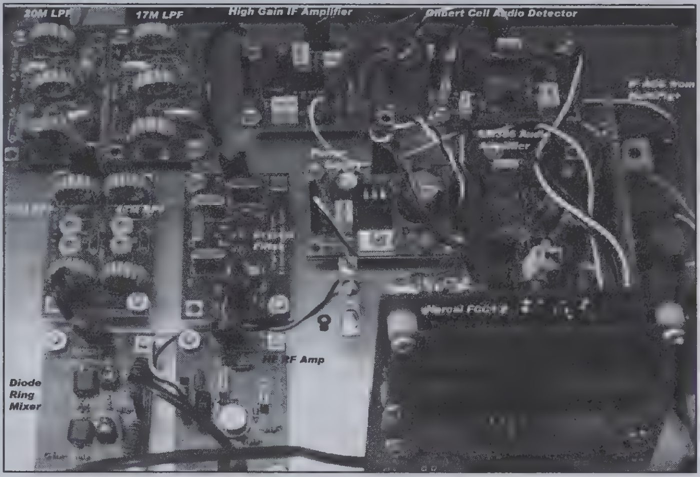
Dubbed "RF Toolkits," they are circuit boards that perform functions of the blocks in a block diagram. Diz refers to them as the QRP Erector Set. The genesis of these kits comes from the multi-PIG+, which was a seven-board kit with only one radio in mind. It was decided that a more comprehensive set of boards would allow a ham to build any flavor radio that they might dream up.

Most RF Toolkits include a small 1.2" x 1.9" PCB plus parts to create an electronic building block. This creates a universal size for most all boards and allows the builder to easily change from one type of circuit to another. For example, a design may include a discrete audio amplifier and you may want to try an LM386 design. The RF toolkits provide both. A complete list of the available RF Toolkits is found at http://kitsandparts.com/rftoolkits.php.

The boards may be interconnected by hard wiring or by using jumper cables built up from the Universal Interconnect Kit (see Kits and Parts web site). I prefer the jumpers since it allows for a more plug and play type construction.

My first project was a simple 20-meter receiver (see photos) made up of a Universal LowPass Filter, Universal BandPass Filter, Universal Diode Ring Mixer, HF RF Amplifier, Crystal Filter, High Gain IF Amplifier, Gilbert Cell Audio Detector and LM386 Audio Amplifier boards. I used the NorCal QRP Club's FCC-1/2 DDS VFO for the local oscillator. I planted everything on a double-sided circuit board using 1/4-inch standoffs. It worked—or I should say—it worked very, very well! I was impressed. But why stop here? I started to feel like the ham radio version of one of those old movies where a bunch of kids decide to put on an impromptu play; "Hey, I've got this old 'S' meter and a HYCAS IF board and this NEScaf and why not add on a linear, some T/R switching and make a transceiver." Yeah, now we're talking. To me, this is the whole point of the QRP Erector Set—make a radio according to your own needs. Using these building blocks allows for a lot of latitude in making additions or modifications as you go along. As it stands now, my Erector/NORCAL/HYCAS/NEScaf/multiPIG+ transceiver is at the point where I'm adding the Pin Diode Switches so that I can use 20/17/15 meters with the turn of one switch instead of moving a bunch of jumpers around.

When I first visited KitsAndParts.com I was convinced that even though I don't know Diz, these kits were personally designed for me. After all, I had built every kit out there (or so it seems) and now wanted to move on to the next step. A modular approach to building a radio is brilliantly implemented with the RF Toolkits. Although all of the boards are not yet available in the toolkit, there are enough to quite easily put together a 40 meter receiver with a conventional VFO. The boards are small, cheap and come with or without parts. The average board is $8.00 with parts and $4.00 without parts.

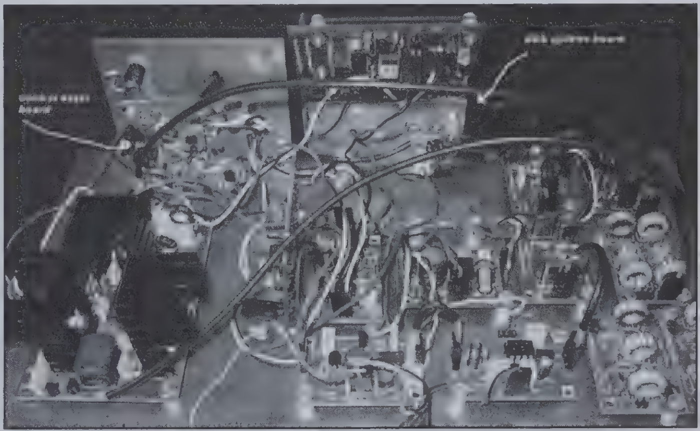


My "Erector Set" rig layout.

There is a Forum at the Kits and Parts website where you will find information on the RF Toolkits. You can also see pictures of my on-going project. Leonard, KC0WOX has made some excellent videos about some of the boards that are not only relevant to the RF Toolkit but are good viewing to anyone looking to increase their knowledge about how a radio works.

We are very fortunate to be living in a time where so many top designers have been making contributions to the QRP community. The Internet has made a lot of their projects available to us at a price that I can only assume barely covers their costs. I further assume that most of these projects are a labor of love. Being a top designer doesn't necessarily make you a top promoter. Some are better than others at that. None-the-less, getting the word out is often left to the end user—people like me. I don't mind at all. In the long run I am the beneficiary of their wisdom. In the case of the RF Toolkits, I can unequivocally tell you that whether you're building a platform for testing crystal filters, transmitters, receiver front ends or a finished radio, this is the best product I've seen.

I've always wanted to homebrew and get on the air with my own radio. So far, this is the closest I've come. NOTHING in ham radio feels better! ●●



Rear view with the amps installed (lower left).

QRP Field Day—Tips & Tales

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Editor's Note: This article is reprinted from the Proceedings of the 2005 FDIM Symposium:

It all began in 1978. Having dabbled with QRP design and operating for a long time, I jumped at the chance to join Wes Hayward, W7ZOI for a Field Day outing. Our destination was the southwest side of Mt. Hood (in the Cascade range, about 70 miles east of Portland, Oregon). After making the scenic drive to historic Timberline Lodge at 6000 ft. elevation, we hiked another 2000 feet up the snowfield and set up camp on a protruding outcropping. Mt. Hood, basically a huge ash pile, was snow covered at that level but the outcropping was bare. Not anticipating any severe weather, we brought a brand new Eureka Timberline backpacking tent I had just purchased (which, incidentally, I still have and occasionally use). The rig was a small homebrew 40 meter transceiver Wes had designed and built, powered by some surplus nickel cadmium batteries. For an antenna, we set up an inverted vee, supported by a half dozen stackable five foot sections of Radio Shack aluminum masting.

The view was exceptional, with Mt. Jefferson and other giants of the Cascade range visible, including the classic near-perfect conical shape of Mt. St. Helens. (Of course, little did we realize that less than two years in the future its shape would radically and permanently change.) Conditions were marginal, our antenna was poor, and our location was less than ideal, so contacts came slowly. But the beautiful view and good company reduced the importance of actually making contacts to an inconsequential level.

As night fell, the wind, which had been just a breeze, began increasing in intensity. By the time it was dark, the tent walls were flapping loudly. And as we were bedding down late at night, the moaning of the antenna guys and flapping of the tent flaps was reaching an alarming level. I estimate we had gusts of around 50 mph, obviously much more than the light duty backpacking tent was intended to withstand. I recall waking several times when a hard and sustained gust shook the tent, thinking that the tent, with us in it, would surely be blown over the edge. Some time in the middle of the night, we got up, drove some additional stakes, and attached a couple of guy ropes to the tent. It was quite a night!

Dawn finally came, and with it colder weather and continued wind. The inside of the tent was covered with a thick film of very, very fine abrasive powder. The tent walls of tight weave Nylon had sifted the blowing pumice, allowing only the finest to get through. It was as though several cans of Bon Ami scouring powder had been spilled and sprinkled about inside. Breakfast taught us the meaning of "true grit."

When all was said and done, we had made a total of about 50 contacts in the 24 hour Field Day period. One tent pole was bent—no easy matter, I discovered when I tried to straighten the very tough tempered aluminum. Wes had to replace the dial drive and all the switches in the rig, which had been ruined by the ingress of abrasive powder. We were tired from the climb and the sleepless night.

I had had a great time, and could hardly wait to do it again!

And I have. In the intervening years, more than 25 now, I've done a QRP Field Day from a remote location, missing only four or five in total. I've hiked in as much as nine miles with a 4000 foot climb, and as little as a few hundred yards (ok, that's not so remote but our tire tracks on the dirt road were untouched and uncovered when we returned to the car at the end of the exercise). When our children were young, my family "car camped" for a few years with good friends, far up deserted logging roads, my friend and I operating Field Day while the families visited and played. I've gone by myself, with a single friend, or with a group of several others. Gear has always been all or nearly all homebrew, solar powered, and with the exception of the few car camping trips, carried in and out by backpack. The demands of self employment have greatly curtailed most other amateur activities, but Field Day is always at the top of my list, never to be missed if there's any possible way to work it in.

In this brief paper I'll share a few of the many interesting experiences I've had over the years, and give a few tips for others who might want to try, or are already involved in, remote QRP operating, either for Field Day or just casual fun.

Some Interesting Experiences

People

My favorite Field Day site, which you'll see a number of pictures of during my talk, involves hiking about a mile on the Pacific Crest Trail, then leaving the trail and hiking cross country for another mile to the top of a ridge. Although there are signs that people have been there (thoughtless people—thoughtful ones don't leave signs), I've only seen one person, once, on the off-trail portion of the hike. It's unusual to see people even on the trail that early in the season, and the nature of the terrain and location means there isn't just a single route from the trail to the ridge top. So I was very surprised to encounter someone about midway between the trail and ridge, deep in the untracked woods. It was Friday afternoon. He was coming down, I was going up. He was wearing a combination of Native American - looking clothing and typical hippie garb, and carrying only a tom-tom. Not a drum, a tom-tom. With feathers. I, on the other hand, had a huge, red, bulging Kelty pack with numerous protrusions, including an extruded aluminum solar panel and the lower half of a fishing pole. (It was miles to the nearest water, and probably farther to the nearest fish.) Held on the outside with bungee cords were several coils of RG-58 coax and a couple of folding aluminum chairs in addition to a sleeping bag, tent, and sleeping pad. He moved silently; I rattled, clanked, and puffed. We saw each other at about the same time, and our paths naturally crossed. We stopped at a friendly distance, exchanged a couple of neutral pleasantries like, "Nice day, isn't it?" and went along on our ways. I have a pretty good idea what he was doing at the top of the ridge (communing with nature, perhaps some religious or spiritual rite, very possibly enjoying a good smoke). But I still chuckle when I think of him trying to figure out just what I could possibly have been up to!

Wild critters

It was one of the car camping years, and the location was just off a remote logging road up the west flank of Mt. Mazama. You might know that volcanic Cascade mountain more familiarly by the name given its most notable feature—Crater Lake. It was about 2 a.m. The families had gone to bed, and my Field Day partner Dave, KØED, and I were sitting outside, headphones on, working 40 meter CW. Suddenly a sound came from the dark, loud enough to be heard through the headphones and over the CW. We both took off our headphones to listen, and a moment later it came again—it was what appeared to be a dispute between a couple of mountain lions. We never did see the cats, but did shine our flashlights off into the dark pretty often for most of the rest of the night.

Tom, K7PJT and I were on my favorite ridge top, cooking dinner. And, coming at a full trot, obviously following his nose, came a coyote, heading straight for our camp. He was pretty close before he noticed us—the moment he did, he did an abrupt about-face and trotted off at the same pace.

Mosquitos can be really bad in the springtime in the Pacific Northwest. We've been lucky to have encountered a large number of them only twice. The first time, we found that DEET, the standard and most effective mosquito repellent, was effective only for about 20 minutes. Even during that short period, we were breathing them and they were flying into our ears and noses. But they were subdued during the cool night, and during the day we kept them down by sitting in the sun. The second time was much worse. Fortunately we had brought head nets (a result of the first experience), otherwise we wouldn't have been able to function at all. The mosquitos weren't deterred by sun, night, coldness, or the fog that formed during the night. Ever since then, any potential Field Day location is automatically rejected if it looks like there's a chance the mosquitos will be bad.

Tame critters

Wes, W7ZOI and I were at the top of Bald Mountain, one of probably 10,000 peaks with that name. We were just off a hiking trail, and had set up several antennas. We knocked off late Saturday night for a few hours sleep. Very early Sunday morning we were shaken awake by thudding and snorting—up the trail came a couple of horses with riders. We barely managed to get feedlines, guy ropes, solar panel wire, and other obstacles off the trail and out of the way of the horses in time. Ever since that experience, we've always chosen locations which are away from any trail.

But even that isn't complete insurance. KØED and I were in the very last stages of packing the cars after a car camping Field Day near Crater Lake, when we heard bells, slowly getting closer. And we were just leaving when a large herd of grazing cattle ambled through what had been our camp and Field Day site. Very close call, but no harm done that time.

Nature

Because the weather is relatively mild in the Pacific Northwest, we don't generally plan on encountering anything too extreme. As experienced outdoorsmen, though, I and my Field Day partners never go out without adequate clothes, shelter, and survival gear to deal with any possible weather situation and most emergencies. But that's not the same as preparing for being comfortable while operating for an extended period. One year, KØED and I hiked nine miles (and up 4000 feet) into the Olympic mountains of northwest Washington. This is very wet and potentially cold country, requiring extra clothing, so we carried an abbreviated amount of radio and camping gear. Unlike less rigorous trips, when we bring a tent large enough for comfortable night time operating, we had only a small two man backpacking tent and a Nylon tarp for shelter and had limited our gear to 20 and 15 meters. Even so, we were pretty heavy.

Radio conditions were excellent, but we had to quit for the night when the temperature dropped to about 38 degrees and the rain blowing horizontally under the overhead tarp made our fingers too numb to work the keyer.

Lightning is rare west of the Cascade mountains, and we've only encountered it once. But I spent enough years in Colorado, Utah and Florida to know just how easy we have it. The small amount of excitement we got from it totally pales in comparison with what a lot of you go through routinely, so I won't bother to talk about it.

Snow is unexpected that late in the year, especially at moderate elevations. But sleet and freezing rain did begin falling on Sunday a few years ago when I was on a solo trip. It slowed my station and antenna disassembly, so late in the day I began preparing to spend an extra night at the site. I had adequate food, but I had carried in the water and it was in short supply. So I rigged up a tarp to drain rain water into a container while I disassembled the station. But although I collected adequate water, at the last minute I decided to hike out, which I did with no problem.

My favorite Field Day site, at the top of a ridge just south of Mt. Hood, is surrounded by terrain with complex and potentially confusing ridges, steppes, and slopes, and dense woods. A number of steep and high cliffs are nearby. Except for a few spots, visibility is very limited. The one mile of cross country hiking to get from the trail to the site or back can't be traversed in anything like a straight line. Because it's at the highest spot in the local area, finding it is pretty easy—you just keep going up until you get there. But going down is another matter—there's an infinite number of ways and directions to go down, and only a few take you to the trail. Combined with limited visibility, slopes can easily lead you in the wrong direction. I'm sure this same combination is often the cause of the frequent cases of people getting lost in the woods in my area of the country.

Well, one year it was foggy when we were leaving the site on Sunday afternoon. Tom, K7PJT, and I left at the same time, but he's a much stronger hiker than I am, so I gave him general directions to the trail and he quickly disappeared ahead of me. I'd been to the site many times by then, so didn't anticipate any problems.

The first sign I had that something wasn't right is that I encountered an unfamiliar slope which was steeper than usual. I knew I was to one side of the usual path, so continued on down. Then I passed the elevation level where I normally intercepted the trail, but without crossing the trail. (This was before GPS, but I've long used an altimeter watch as another source of orientation information.) Some time after that, at about 700 ft. below the top, the fog momentarily thinned and I was able to see the valley below.

It was the wrong valley! I had unknowingly worked my way around and was coming down the wrong side of the ridge. By this time it was late in the afternoon. I was carrying about 70 pounds, just about my limit. I was tired and had had very little sleep, so there was no way I could hike back up to the top of the ridge that day. What do you do when you're in a spot like that? Well, you do what I did. Stop. Find a comfortable place to sit down. Put on a coat so you don't get chilled. Have a good snack and a drink of water. Relax for a while. Then, and only then, think about what to do.

Taking a brief inventory, I was in fine shape to spend the night. I had food, adequate water, and a sleeping bag. I had a 2 meter radio to tell the folks back home, and my Field Day partner, what had happened so they wouldn't send out the searchers. I got out the map and compass. From those, my altimeter, and what little I could see during momentary clearing periods, I got a pretty good idea of where I was. And after some study of the map, I realized I could get to the trail by walking around the foot of the ridge, staying at the same elevation. So no climbing would be necessary. After a good rest I set out, watching the altimeter closely to avoid climbing or descending, and sure enough hit the trail just where I expected. Tom was, of course, already at the car at the trail head. But he hadn't gotten there very long before I did—he had made exactly the same mistake, stopped at very nearly the same spot I had, and had gotten to the trail the same way I had.

Stupidity

Any battery capable of powering even a 5 watt station for several hours contains a fair amount of energy. The short circuit current for some can easily be 100 amps or more. So I've always made sure there was a fuse in line with the battery cable, physically close to the battery. But exposure to sun or just plain age, combined with constant spring pressure, leads to eventual failure of the inexpensive cartridge (3AG) fuse holders I've used. One year, the holder broke just as I was preparing for Field Day the night before leaving. I usually have some in my junk box, but that time it was bare. So, 20 years without a blown fuse, let it slide, I'll do without and fix it when I get back. Bet you probably have a good idea where this is going...

Dating back to earlier times, my rigs have a couple of banana sockets for power, and so of course this had to be also the first time I plugged the unpolarized connector in backward. It was just getting dusk on Friday night. I was inside the large tent, connecting up the rig to check out the antennas we'd just put up and otherwise make sure everything was working. Just as I connected the 12 volt 5 Ah lead acid battery to the rig, Tom, K7PJT, stepped in wearing his headlamp. The smoke was illuminated by the headlamp beam, and I looked down in time to see bare wires fall from their insulating jacket as they melted their way through, falling on the tent floor where they proceeded to melt their way through that. I lunged for the battery connector and snatched it apart before flames broke out. Inspection revealed that, with much more luck than I deserved, no serious damage was done to the rig. A newly installed power switch was in the off position, so no reverse polarity voltage had gotten to the circuitry. A 3 watt diode was connected between the power terminals to act as a crowbar in event of a reverse power connection—but in conjunction with a fuse. All that was left of it was the two leads—the plastic body had exploded and the diode melted. And before it opened, it had gotten hot enough to melt the solder on the connections. After it had opened, a small dipped tantalum electrolytic capacitor across the terminals had short circuited, a common reaction of that type of capacitor to reverse voltage. It was a very good, low resistance short, so the capacitor hadn't dissipated much power and was still completely intact—physically, that is.

After Field Day that year, I replaced both the diode and the capacitor—the capacitor can make a better crowbar than the diode, although it wouldn't operate as quickly or reliably. Need I mention that the battery cable now has an inline fuse, and the junk box has been replenished?

Tips for Remote QRP Operating

I've put together just a few tips for people just considering a first remote or wilderness QRP Field Day or other operating event, as well as those who are already involved in this fun and challenging enterprise.

Style

It's a good idea to spend some time thinking about the style of Field Day you intend to have, and to communicate that to all the participants beforehand. Some people are competitive, and are willing to work very hard to get a good score. Some prefer a more relaxed operation, with the radio and outdoors/camping experience equally important. And some consider Field Day to be only a minor adjunct to an outdoor experience -- maybe climbing a mountain, and operating with a tiny handheld rig and simple antenna thrown over a tree for a few hours at most on Sunday morning. You'll have the best time when everyone has the same expectations.

The Outdoors

Always be prepared! Even if you're going only a short distance away from civilization, never skimp on first aid and survival necessities. If you're not well acquainted with the demands and potential hazards of the outdoors in your intended location, make sure someone comes along who does, and who is experienced. I can't emphasize this enough. Every year, a number of people get lost here in Oregon after going just a short distance away from a trail. As I described in the first section, I got disoriented coming down from a site I'd been to many times, on a short one mile off-trail trek. In this part of the country, hypothermia is a possibility nearly any time of year, so it's important to know about how to recognize and protect against it. In the desert, water is a critical issue. In hot country, it=s vital to know how to recognize and protect against heat exhaustion and stroke. You don't need to fear the wilderness, but it must be respected.

Make a List—-and Check it

Over the years I've developed a Field Day list that's pretty bulletproof. It has separate sections for camping and radio gear, and evolves with time. It also includes extra items which are appropriate for one situation or another. I check each item off as it's packed. I don't believe I=ve ever left behind a vital item on any of the 20+ QRP Field Days I've done. As you're developing the list, and even after you have one, I suggest trying this technique I've used for many years — it's a good one to use for any radio operation away from home: Set up your complete radio station in your back yard at home, just like you intend to use it for Field Day — same rig, power source, connecting cables, logs, pencil, and so forth. Set up your Field Day antennas, too, if possible. Include as much of your peripheral equipment as possible — chair, table, headlamp, etc. Then actually get on the air and work at least one station. When you're finished, get a box and as you put each piece into the box as you disassemble the station. Your box now contains a for-sure guaranteed complete station that's capable of communication. This doesn't protect you from forgetting the second set of earphones for the other operator (unless he/she is with you during the test), mosquito repellent, or other essential items. But it goes a long way in insuring that the vital equipment is together. Oh, and don't forget to bring the box!

Tools

A small, light weight basic set of tools has saved my bacon many times. Essential elements are a butane powered soldering iron (e.g., Weller Portasol), small coil of solder, a little hookup wire, small wire cutters, hemostat clamp to use as long nose pliers and second hand, a little tape, small screwdriver, a couple of clipleads, a small digital DMM, and spare fuses. I've also taken spare diodes and transistors, but have never used them. A one ohm resistor can be used for measuring current if the DVM doesn't have this capability. (Put the resistor in series with the circuit and measure the voltage across it.) This basic tool box is definitely worth the small amount of extra weight, and I never go without it. A Leatherman tool is often handy for repairing packs and larger items, but I sometimes take my chances and leave it behind to save a few ounces. I always have a little mild steel electric fence wire and cloth duct or similar tape in my pack, as well as an ample amount of Nylon cord, radio operation or not.

Power

The power source has been a topic of constant interest and evolution, because of its being both a fundamental necessity and one of the heaviest single items among the radio gear. Many options are available these days, and a whole presentation could easily be given with this as the only topic. I've chosen to use solar power for daytime operation. This effectively reduces the battery capacity requirement by about half, provided that the weather will reliably be clear for most of the operating period. I usually put an extra solar panel and battery in the car, and decide at the trail head whether to bring them based on weather predictions. If you use batteries only, primary (non-rechargeable) cells generally provide the greatest amount of energy per unit weight. The length of this presentation doesn't permit a detailed description of all the possible options, so I'll just briefly describe what I use and why.

The method I've used for many years for Field Day operation is to use a solar panel during the day and batteries during the night. Batteries are also required in conjunction with the solar panel. The solar panel size is chosen so it's able to supply enough average power to run the station. The rig requires relatively high current when transmitting, and the panel isn't sized to produce adequate power during those short but high current periods. So a rechargeable battery is "floated" across the solar panel and rig. It acts as a reservoir, providing the high peak power required when transmitting, with that energy being replenished while receiving. I begin the FD period with a fully charged battery, and when the sun sets I begin the night with a battery that's still fully charged.

For the past number of years, after using both lead-acid and NiCd, I've settled on the latter as the best solution for me. The first step is to determine the approximate average current the rig consumes. This is done for a CW rig by multiplying the keydown current by the fraction of the time the key is down (25% if equal time is spent transmitting and receiving; more like 10 or 15% for the hunt-and-pounce operation typical for QRP operation). Add the key-up current times the fraction of the time the key is up, and you have the average current.

Then I size the solar panel to supply at least that amount of current. For example, for my main FD rig, the average current is a bit under 200 mA, so I use a solar panel capable of supplying 200 mA in bright sun. NiCd cells are selected to have a capacity of about ten times that amount, in mA-h, in my case about 2000 mA-h. This gives me the capacity to run my rig for ten hours at night. The advantage of the 10:1 ratio of battery capacity to solar panel current is that, because NiCd cells can tolerate a C/10 charge or overcharge for an extended period without damage, the panel can simply be connected across the battery without any regulation at all. If the batteries go into overcharge, no harm is done. There's no easy way to determine the state of charge of NiCd cells, so they'll be overcharged—that is, energy will be supplied to fully charged cells and simply converted to heat —for at least part of the time if you're shooting for a fully charged battery at sundown. The disadvantage to this simple method is that the cell voltage can rise to nearly 1.6 volts when overcharging, and it quickly drops to about 1.3 or 1.35 volts when the rig is keyed. If the radio isn't able to tolerate this swing, a voltage regulator should be put between the battery/solar panel and the rig. A switching regulator is preferable over a linear regulator because of its higher efficiency, but any switching regulator should be tested for RFI before being put to use. To accommodate the different voltage during daytime overcharge (up to 1.6 volts per cell) and nighttime use (1.2 - 1.3 volts per cell, dropping to about 1.1 as the battery discharges), I use a pack of 11 cells, tapped at 9, 10, and 11 cells. I power my rig from whichever tap provides a reasonable voltage at the time. This method is fine for the relatively slow changes in cell voltage under varying circumstances, but a regulator is still required if a rig can't tolerate the rapid voltage drop when an overcharging battery is producing high current for transmitting. If longer nighttime operation is desired, or if there's a chance of extended periods of cloudy weather, both the battery and solar panel sizes should be increased in proportion.

For several years I've been using a pack of surplus NiCd C cells. I recently splurged and purchased some modern sub-C cells with about the same capacity as the older C cells, in an effort to reduce weight and volume. As it turns out, the weight is nearly the same (just under two pounds, including wires, connectors, fuse, and box) but it's nice and compact, about the size of a pack of cigarettes and 1-1/2 times as thick.

One thing to keep in mind is that it doesn't take much cloud cover at all to reduce the output of a solar panel to 10 percent or less of its full-sun value. So while short periods of cloudiness can be tolerated, a solar panel isn't going to be useful if the sky will be cloudy for most of the day, unless the panel is made many times larger than it would for sunny weather. The best thing to do if you anticipate a significant period of cloudy weather is to use the same size solar panel (presuming you expect some sun), but increase the battery size so it can power the rig during the cloudy periods. Another important thing about solar panels is that if even one cell is shaded, the output drops to nearly zero. So the panel has to be kept in a perfectly clear area, and moved as necessary during to day to keep it in direct sun and free of even small shadows.

There are several other viable power sources for Field Day, but the length of this presentation doesn't allow me to discuss them here.

Antennas

Like power sources, Field Day antennas is a topic which could easily take up a presentation by itself. I'll limit this section to a few general comments.

Choosing the antennas

The choice of antennas to use depends heavily on your location. The requirements for operation from my home in Oregon are very different from operation from here in Ohio. The nearest large population centers (except a very few cities in the West) to me are 1500 miles away, with the bulk of the potential contacts being from 1500 - 3000 miles. I have to choose the same antennas I would to work DX—radiation angles of a few degrees are vitally important. In contrast, someone operating from the country's heavily populated areas can do well with antennas with maximum radiation as high as 30 degrees above the horizon, and maximum propagation in the range of 500 - 1000 miles. (Of course, if you follow those recommendations you'll have trouble hearing me, so feel free to ignore them!) The ideal situation if you can't rotate your antenna or switch its direction is to have its pattern just cover the desired area. That way you'll get the maximum gain possible in that area.

The "Field Day Special"

My favorite antenna for Field Day use is the Field Day Special, a two element wire array described in June 1984 *QST*. Hopefully, by the time you see this, that article will be at http://eznec.com/Amateur/Articles/. A text file description of the antenna and a program to help design it for any band can be found at http://eznec.com/misc/. Download fdsp~.exe—it's a self-extracting ZIP file.

This antenna is ideal for locations on the West Coast because the pattern just covers the most populous areas of the U.S., and it's very compact and light weight. The pattern is also easily reversed, although that feature isn't used for Field Day. It might be a viable choice for some other locations such as Florida. I've used them on 20 and 15 meters and, when "car camping," on 40 meters.

Location

Location can make a tremendous difference in the elevation pattern of your antenna. Ridge tops, near an eastern edge, is ideal from the West Coast. I use an old DOS program, TA (Terrain Analysis), which I believe is still available from its author K6STI by mail sent to his Callbook address. TA takes as its input a free space pattern from EZNEC or Brian's antenna analysis programs and shows how the pattern is modified by the shape of the terrain.

Improvements of many dB at low angles are possible by proper siting. People operating from the middle of the population center, who need higher angle radiation, would probably be best off with relatively flat ground.

Feedlines

I favor coax over twinlead, window, or open wire line because it can be thrown on the ground, run through wet trees, coiled, or rained on without affecting its properties. RG-58 is used for 20 meters and above, and some RG-174 (0.1 inch diameter) type coax is often used for 40 meters and below where its loss is tolerable. RG-174 is much lighter and smaller than RG-58. The very small reduction in loss afforded by RG-8X isn't worth the significant increase in weight. My experience, though, is only at HF. Loss is much greater for VHF/UHF operation, so it should get appropriate attention when choosing lines for that frequency range.

Whenever possible, I have multiple antennas share one feedline, to reduce the amount of feedline I have to carry.

Parting shots

The purpose of Field Day is to demonstrate the ability of the amateur to operate under portable and emergency conditions. This doesn't mean that Field Day has to be run like an emergency exercise. Nor, for that matter, does it need to be regarded as a contest. By just putting together an outdoor station and using it under primitive conditions in a remote area, you're developing skills and equipment which will be of great value in any real emergency. This is true regardless of the style of Field Day you choose to have. So concentrate on having fun. If it's not fun, do something else the next year—change your style, or go with different people. It's the high point of my year—I hope it'll be a major source of enjoyment and pleasant anticipation for you too!

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Information about this year's event is included on pages 11-15 of this issue.
Full details, including online registration, is also available at the QRP ARCI Web site:

The Three-Tube Mini-Boat Anchor Experience

Jeff Smith—VE1ZAC jhsmith@ns.sympatico.ca

"Thank goodness hams retired this stuff!"

Some months back, I thought it would be fun to dig out some junk box parts and show my son Zac how "easy" it would be to knock together a really simple CW tube transmitter. I admit, I was taken by the "WD8DAS Two-Tube Tuna Tin Transmitter" that was published in *QST*. Zac and I decided it should be similar and crystal controlled.

But then... I started to think, why not jazz this thing up a little? Why not indeed! A couple of bands would be good. QRP action, let's do 80M and 40M. What the heck, toss in 30M and 20M also as it is only a tank circuit we are talking about. Band switching? Sure, easy! Crystals? I had one and it was the wrong freq for any real contacts, so I did order some FT243 fundamentals from a fellow in Florida who has a basement full of old holders and will cut crystals for you.

More features? You bet! Power supply on the chassis? Yup. I have lots of 5763's, so why not parallel up the PA stage for more power? Sure thing. A "rubber" control, so I could get some minor amount of frequency control. Spot switch. A meter to see PA mA. A T/R relay. An isolated cathode keying circuit for safety. Maybe a regulated B+ for the oscillator. A semi-break in control. Oooooh... I even found a couple of unused vernier drives. A receiver antenna output. Yes, yes, YES! (...you see, this how engineers get themselves in trouble. It's called "feature creep.")

Well, with the exception of the crystals, the junk box did indeed produce all the gubbins needed to start. And start we did.

Problem number 1 was innocent enough. The only thing I had around that was even close to a chassis was a heavy steel box. It was just too heavy to be considered simple chassis work, so it quickly became a machine shop project. I needed the vertical mill to whack holes in the beast. I lost Zac about this point. No problem, I thought, I will just get this chassis done and painted and then Zac and I could recreate that mythical Heathkit experience as father and son spend pleasant hours soldering parts into the chassis and operate the thing on the air. (I really should have sobered up at this point and bailed out, in hindsight)

Chassis done, parts rounded up, everything fitted out. So far, so good. I managed to keep Zac interested for about 20 minutes. He normally likes soldering parts to circuit boards, but this was far more difficult and demanding. Lost Zac for the second time at this point and I gamely soldered on. I finally got the basic stuff together. I started out with the 6C4 oscillator and would use the 5763s as a parallel PA stage. (I calculated the tank impedance to match two 5763s in parallel.)

Problem number 2: I didn't have the right power transformer. I have lots of old salvaged power transformers but they all produced way too much voltage on the secondary. I wound up spending oodles of hours screwing around with this issue, trying up to half a dozen different arrangements to get to the needed 250 VDC B+, 6 VAC for the heaters and 12 V for that non tube-feature list that I had decided to throw in! The dagnabbed ^&%$^%# power transformer was finally working. Time spent so far: 17 hours. Yikes!

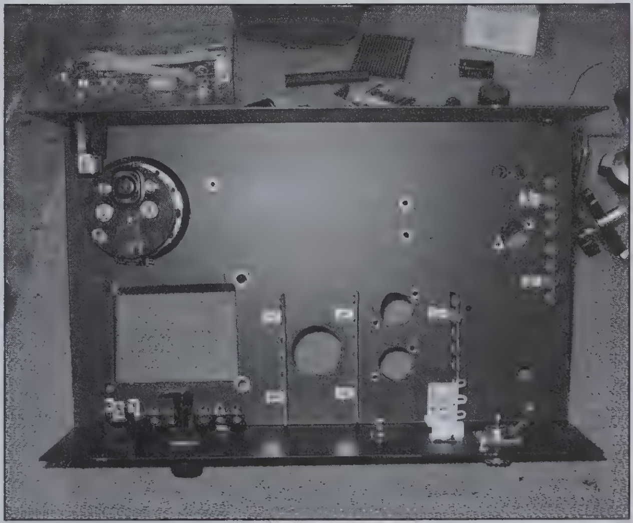
OK, it's all together. NOW I can get to the rush of operating my new tube rig! Ummm, well, not quite yet.

Problem number 3 rears its head. The 6C4 works OK but droops like crazy. Man, I turned a receiver on to listen to the oscillator while keying the unit. I couldn't put that on the air. It was awful. It might be something you could use to extract confessions, but it sure wasn't going to contribute to a QSO. Now I decided that what I really needed was a high voltage regulator in the thing. I have lots of tube regulators but it would involve drilling another hole in that hateful nuclear bomb-proof chassis. I decided to "cheat" and slip a power NMOS fet shunt regulator inside where nobody could see it. After all, I did use a couple of NMOS fets to do the cathode keying to keep lethal voltages off the key contacts. Nobody would ever know. Right? Another 12 hours rolls by. New total: 29 hours.

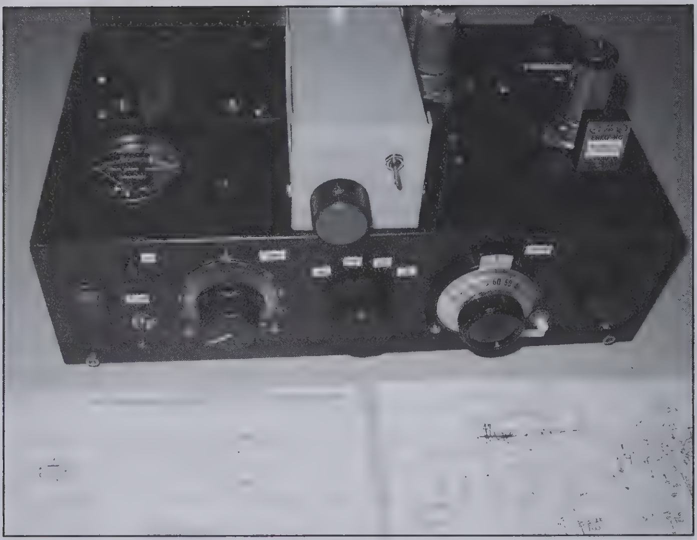
Is the rig working yet? No.

Problem number 4 hovers over the horizon. I can't get more than about 12 V RMS across the 50 ohm dummy load with

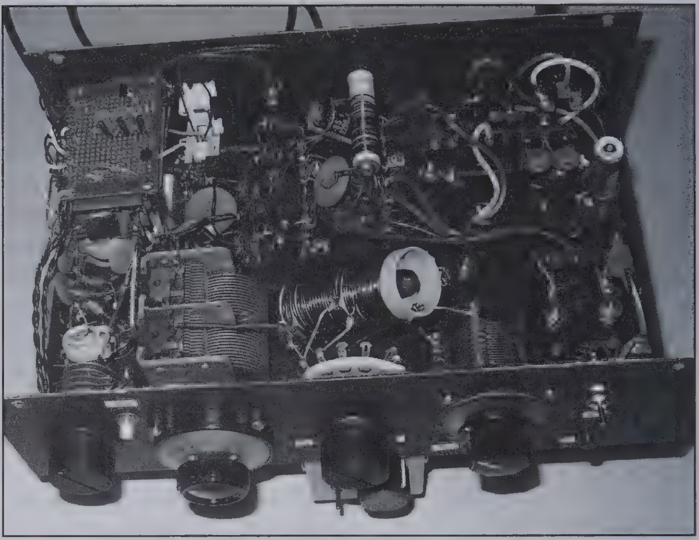
Mini Boat Anchor during construction.



The nuclear bomb-proof steel chassis.



The Mini Boat Anchor in almost finished form.



The view inside the Mini Boat Anchor.

the bleeping thing. This equates to about 3 watts RMS out. Wow, after all that, and it weighs about 15 lbs at this point. 5 lbs per watt! A marvel of modern materials and methods! At this point, I pretty much abandon my dream of the cute little two tube rig, and realize I have entered the world of BA's. (Boat anchors, if you haven't heard that term before.) I decide to get this thing on the air and manage to coax Gary, VE1RGB and Dick, VE1AI into an 80M QSO. That goes OK. All the way across town too! Wow.

—Intermission (of 3 months)—

Just to prove that as you get older, your memory fails more often, I decided this week to have another go at my albatross, er, I mean tube project. Digging out my tube references and working through the load lines for the 5763s, I decide that my problem may be the 6C4. Its not up to the job of driving the two 5763s. What I need is a beefier oscillator. I decided to use another 5763. That entails a rethink of the whole thing. The original circuit coupled the oscillator to the PA with no tank or filter. That isn't really good practice, so I decide to add another small tuned peaking filter for the oscillator.

Problem number 5: there is no more room under this pig for another coil and variable capacitor. Only one thing left to do... add a carbuncle on top and yet another knob to twiddle with on the front panel. It's getting heavier! While I am at it, I try and remove some of the now surplus junk and just generally bad ideas. The verniers were a complete waste of time. I got rid of one. The "Stealth HV regulator" was no longer needed, so out it went. Figure 3 shows how the rig looked after this surgery.

The new oscillator works fine. And, my new output power is slightly better than before. I might be able to claim a whopping 6 or 7 watts on some bands. A pile up buster it isn't.

No more changes for now. It's time to work a few brave souls and put some operating time on this thing.

Time on this last phase: 12 hours. New total 41 hours. Almost a work week. Was it worth it? I will have to think about that. Total father and son Heathkit time: about 60 minutes.

Another change was in order. I noticed during operation that the little RF chokes I was using for the plate circuits were getting VERY warm. How do I know this? Smoke and plastic were being ejected from the things in a long key down test. Oooops. I found an old ceramic coil form and wound a proper choke with some heavier wire.

Figure 4 is a picture of the guts (which I am somewhat reluctant to show). It's a bit of a mess. This is the problem with a live "breadboard" project that you keep changing. They all turn into a mess. You can see the new PA plate choke, the green wire wound on the ceramic form on the rear. Also you can see the end of a piece of ferrite bar I stuck in the tank coil to provide a little "fine tuning" to the coil. Lower left corner is the oscillator, above that is the relay and cathode keying and break in circuit. To the right of that are the PAs, then the transformer. Back to the lower right corner is the PA mA meter, and then the tank consisting of the two capacitors and switched coil assembly.

Operating: My Autek inline power meter tells me this thing delivers a solid 4 to 5 watts on 80, 40 and 30M. 20M is less, but the oscillator isn't real stable on 20 anyway, so I probably will just give up on that band. The other three are operating OK. The freq is a bit unstable but I have had QSOs on the bottom three bands on the QRP part of the bands and nobody screamed at me. It's useable. It sure makes you realize how spoiled we are with our new transceivers though.

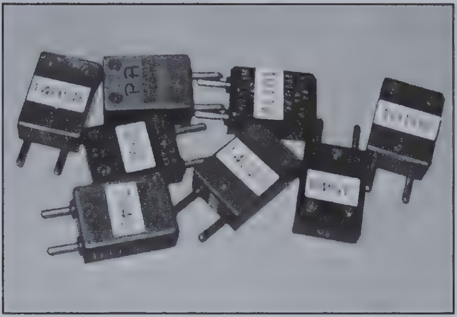
Figure 5 is my crystal stash. I have two "rocks" for each band and I can "rubber" the frequency a little on either side of these.

If anybody wants to try a QSO while I use this thing, send an email and we will set up a sked.

I tried the rig out this afternoon on 40 and 30. First contact on 40 was with a fellow in NY who said my 4 watts was a very good signal on the band and we gave each other a 599. The 30M contact was a CQ with 3 watts, and who comes back to me but a 13 year old ham in Athens, Alabama who had just completed a 1 watt homebrew rig! It is a blast to make contacts like this with a homebrew rig, a "glowbug" in this case.

Postscript: If you decide to have a go at a glowbug project like this, be advised that most of these tube circuits have need of a B+ power supply of over 150 VDC and currents sufficient to kill you, if you elect to do something foolish. If you are unfamiliar with higher voltage power supplies and circuitry like this, get a little coaching from somebody who knows what they are doing first. And, of course, be careful with kids and pets hanging around while you have stuff exposed. Begillions of people have worked on stuff like this, so don't get all freaked out about high voltages, just put your high voltage safety hat on!

Addendum: It's fun to re-read some of these stories and laugh at the decisions one makes during the "History" of a project. Remember the removal of the useless vernier and the HV power supply? They're back! I had another go at fine tuning the rig and have it working on all 4 bands now. It can do 7 or 8 watts on 80 and 40 and 5 watts on 30 and 20M now. The tuning is kind of fussy, so the verniers are useful after all. Plus, one can make a little chart of the settings for rapid setup. The droopy oscillator was finally solved by leaving the oscillator running all the time. Problem with that is the receiver staying locked onto that signal even while you are trying to listen. I solved that problem by turning the oscillator on with the T/R relay and leaving it on during a burst of dits and dahs. It goes off during the listen periods. It's a bit unusual to operate with it this way, but it works fine and the operator on the other end will be appreciative of a steadier tone on their receiver. (I hope).



The old-fashioned FT-243 crystals.

Lessons Learned (or Re-discovered)

- It's easier to build a simple transmitter from solid state devices, and it will probably work better.
- Tube rigs are big and heavy!
- They do indeed glow and get warm. (A nice wintertime feature)
- Full or semi break in with a simple tube rig is rather problematic. It would be a lot simpler to use a manual T/R switch, which would also take care of all the other issues like droop and stability.
- Multi band features add a LOT of complication to a tube transmitter like this. A one-bander would need almost none of the controls used in this project and could be "tweaked" once and ignored thereafter. Tweaking this thing up for each band is a bit of a procedure.
- Yes, one does indeed feel a connection with the earlier days of radio when you make an attempt to get a tube circuit running!

Happy tubing!

●●

It's Easy to Write for QRP Quarterly!

We're not joking! Writing is as easy as telling your friends about that latest QRP project or fun operating experience. Because that's what you're doing! Your friends in the QRP ARCI community are interested in all kinds of articles and stories. And all QRPers have done *something* that is interesting in their operating, building, or hanging out with fellow QRPers.

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You get the satisfaction of sharing ideas with other QRPers, receiving a little bit of fame at the same time!

To get started, just Contact the Editor or any Associate Editor with your idea! (Contact information is on page 3.)

Space QRP—A New Frontier

Tom Lilley—N3TL N3TL@bellsouth.net

At 00:28 UTC last June 28th, my quarter-century addiction to QRP took a giant leap with one small step. I keyed the mic on my Yaesu VX-7R HT and called KD8ILL in Marion County, W.Va. He answered, we exchanged locations using maidenhead grid squares, and I completed my first-ever satellite contact.

Several months and more than 1,500 satellite-QRP contacts later, I urge my fellow QRP-ARCI members who haven't yet done so to consider taking their low-power operations into Low Earth Orbit. Doing so will provide new challenges but the same sense of accomplishment that we enjoy with our other low-power operations.

Blast Off With FM

You probably already own all the radio you need to get on one of the Low Earth Orbit (LEO) satellites that operate in FM with a cross-band transponder. Yaesu's FT-817s will do it—even with the supplied duck antenna! Or, you can start out as I did, with a dual-band handheld radio capable of dual-receive and semi-duplex split operation. I own a pair of 817s now, but I worked and confirmed more than enough grid squares to qualify for the ARRL's Satellite VHF UHF Century Club (VUCC) award with the VX-7R and a dual-band handheld yagi made by Arrow Antennas, of Wyoming.

Before getting more into the gear you can use for "Space QRP," let's look at the FM LEO satellites currently in operation.

AO-51

My first satellite contact, with KD8ILL, came via satellite AMSAT OSCAR 51 (AO-51, a.k.a. ECHO) on the fourth anniversary of its launch—June 28, 2004. Its orbital track has a perigee of 696 km (432.47 miles) and an apogee of 818 km (508.28 miles).

Its primary V/U repeater pair is 145.920 MHz up and 435.300 MHz (±Doppler—more about that later) down. AO-51 also can accommodate 1.2 GHz and 2.4 GHz operation, and the control team rotates operating frequencies and modes on pretty much a monthly basis to provide operation that appeals to many different amateur radio interests.

AO-51 is sometimes configured to operate in FM at 145.880 MHz up and 435.150 MHz (±Doppler) down for QRP operation, with a requested limit of 10 watts RF out. Some will disagree with this statement, but effective QRP operation is possible—as it is on the HF bands—in the middle of stations running much higher power out on the "standard" frequency pair mentioned first.

AO-51 is a 24 cm (9.45-inch) cube, and it weighs 11.14 kg (24.56 lbs.). Here is a partial description of AO-51's onboard equipment, as posted on the AMSAT-North America Web site:

"AO-51 contains an FM repeater with both a 144 MHz and 1.2 GHz uplink and 435 MHz and 2.4 GHz downlinks. Additionally AO-51 contains a digital subsystem that transmits TLM on 70cm and provides complete PACSAT BBS that can be configured on both V and S band uplinks. There is also a 10 meter PSK uplink.

"With four VHF receivers, two UHF transmitters, six modems, fifty-six channels of telemetry, and various other subsystems AO-51 is quite a complex spacecraft. The two UHF transmitters are connected to four antennas, two in the right-hand circular polarization (RHCP) and two in the left-hand circular polarization (LHCP). Transmitter A is connected to the LHCP antennas and is often used for digital modes. The transmitter often used for analog is connected to the RHCP antenna."

Depending on its configuration, the V/U repeater re-transmits signals at power levels generally between approximately 300 mW and 1 watt. Power demands of various configurations affect the output power of the satellite's transponders.

SO-50

SO-50 quickly became my favorite satellite. I like to think of it as the orbiting FT-817 of the satellite brigade! The following description, also posted on the AMSAT-NA Web site, helps explain my perspective on Saudi OSCAR 50 (a.k.a. Saudisat-1C):

"SO-50 carries several experiments, including a mode J FM amateur repeater experiment operating on 145.850 MHz uplink and 436.800 MHz downlink. [*Author's Note: The downlink apparently has shifted since launch, and appears now to be centered at 436.795 MHz.*] The repeater is available to amateurs worldwide as power permits, using a 67.0 Hertz PL tone on the uplink, for on-demand activation. SO-50 also has a 10 minute timer that must be armed before use. Transmit a 2 second carrier with a PL tone of 74.4 to arm the timer.

"The repeater consists of a miniature VHF receiver with sensitivity of –124 dBm, having an IF bandwidth of 15 KHz. The receive antenna is a 1/4 wave vertical mounted in the top corner of the spacecraft. The receive audio is filtered and conditioned then gated in the control electronics prior to feeding it to the 250mW UHF transmitter. The downlink antenna is a 1/4 wave mounted in the bottom corner of the spacecraft and canted at 45 degrees inward."

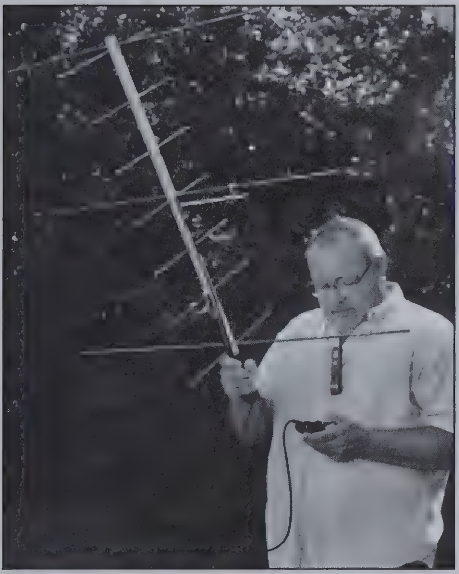
Think about that—SO-50 nominally transmits a quarter-watt into a zero-gain quarter-wave antenna mounted on one corner of the satellite, which is in an orbit with a perigee of 603 km (375.69 miles) and an apogee of 713 km (443.04 miles). I hope that helps you see why I think of it as a LEO QRP rig! SO-50 is a 35 cm (13.78-inch) cube that weighs 10 kg (22.05 lbs.).

AO-27

As I write this, AMSAT OSCAR 27 is off the air. Work continues to restore it to full operation, and it's appropriate to include because of its historical significance. You can read more about it on the AO-27 Web site (www.AO27.org).

When it became operational after launch on September 26, 1993, AO-27 became known as "Easy Sat" (according to the AO-27 Web site) because it provided hams with the first FM LEO satellite they could operate into without a multimode VHF/UHF radio.

It uses the same V/U frequency pair as SO-50 [i.e., 145.850 MHz up/436.795 MHz (±Doppler) down], but it does not require a PL tone. From my first contact on AO-27 in early July 2008 until it went offline in mid September 2008, that lack of a PL tone often provided for interesting lis-



The initial N3TL QRP satellite station included a Yaesu VX-7R HT, an Arrow handheld yagi and a digital recorder for help in logging.

Today, the N3TL handheld station includes either the VX-7R or a FT-817ND and the Elk 2M/440L5 log periodic.

tening when the satellite's "footprint" included Central and South America because of the obviously non-ham chatter in Spanish that made its way to orbit and the satellite.

AO-27, the smallest of the three FM LEO satellites, is a 15 cm (5.9-inch) cube. It weighs 11.8 kg (26.01 lbs.), and orbits with a perigee of 789 km (490.26 miles) and an apogee of 800 km (497.1 miles).

International Space Station

Richard Garriott's fall 2008 expedition to the ISS gave hams around the world a chance to work him almost 25 years after his Dad, Owen (W5LFL), became the first ham in space. That's not the only opportunity for working the ISS, however. You can find all the information you need to work the biggest—and only manned!—satellite in the sky at the Web site for Amateur Radio on the ISS at: www.ariss.org.

On the Way

At this writing, two more satellites with FM capability are scheduled delivery to Low Earth Orbit in the near future.

South Africa's SumbandilaSat is scheduled for a March 25, 2009, launch, weather permitting, aboard a Russian rocket. Its payload includes an amateur radio system with a VHF up/UHF down transponder similar to those in use on the satellites described earlier. The satellite's name came from a competition among South African students, according to a post on the AMSAT-South Africa Web site (www.amsatsa.org.za):

"A competition was held amongst high school students. Entries in various languages were received but ultimately the Venda language version was chosen 'Sumbandila.' It means showing or pointing the way. Freely translated into English, 'Pathfinder.' "

The Chinese satellite XW-1 is scheduled for launch in August 2009. The following information comes from the IARU Satellite Coordinator, as posted on the AMSAT-North America Web site:

"A micro-satellite for amateur radio purposes is planned. Payloads will include a CW Telemetry Beacon, Linear Transponder, FM repeater and a Digital Store-forward Transponder. The operations will all have 70cms downlinks and 2 meter uplinks. 500mW output is planned. The satellite is expected to have a mass of 30kgs and be launched from China into a sun synchronous orbit with a 670km apogee. The launch is now planned for August 2009 and the CA-1 designation has been updated to XW-1."

This description also alludes to some of the other modes available to amateurs in currently-orbiting satellites, but this article focuses on those QRP operators who might wish to try satellite operation with gear they already own for HF operations (e.g., the FT-817) or local VHF/UHF communications (e.g., a dual-band HT like the VX-7R).

Operating Perspective

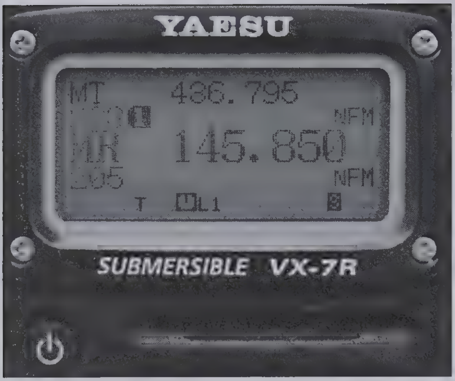
Think about these descriptions. The FM LEO satellites already in orbit, and those on the way, represent very tiny "targets" that operators around the world are hitting with their signals several times each day. Those of us who choose the challenge of low power handheld operation are making the trip into orbit by manually tracking the satellites during the 10-12 minutes of each pass when their "footprints" include our locations.

Rarely, if at all, do any of these satellites re-transmit the signals they receive using 1 watt or more RF output. Their nominal output powers are measured in milliwatts. As a result, the receive side of a contact made through an FM LEO satellite is always QRP, and it speaks volumes about the power necessary to complete a successful contact.

In July and August 2008, I decided to experiment with very low power on the satellites. I replaced the lithium-ion battery back on my VX-7R HT with the optional BP-23 battery case and installed two AA Duracell batteries. When running on alkalines, the HT's output defaults to 300 mW. I chose to operate at the other available power output, which is 50 mW—yes, that's 0.05 watt.

I made 51 contacts at that power level and three more at 300 mW before that pair of Duracells drained. I worked 21 states, Ontario and Mexico—all at 50 mW RF out. I worked stations via all three satellites described above, and only 11 of the 51 contacts came over the AO-51 "QRP pair" of 145.880 up/435.150 down. That's significant because it means the other 40 contacts came during passes where stations were operating whatever power they chose. I thought of it like working DX pileups on the HF bands as a QRP station. I competed against everyone else and made 40 good contacts running 0.05-watt out.

One of those contacts, with KC9ELU in Indiana, is particularly significant. When we worked, AO-51 was at 8.6 degrees elevation to my west/northwest at a range of 2,482.003 km (1542.245 miles). With 0.05-watt, my signal covered the equivalent of 49,640.06 km (30,844.9 miles) per watt to reach the satellite!



The small "L1" at the bottom of the display signifies a power level of 50 mW (0.05-watt) RF out on the Yaesu VX-7R. The author completed 51 contacts through the FM LEO satellites at this power level on the same set of two AA Duracell batteries.

You Can Do That, Too!

Any QRP fan can enjoy the same kind of out-of-this-world fun via the FM LEO satellites. In addition to FT-817 owners, anyone who owns an HT similar to mine can be operating "in orbit" quickly with a suitable antenna.

The Arrow model 146/437 10WBP is just one antenna you can choose to complete a fully handheld satellite station. These days, I am using the Elk 2M/440 L5 log periodic, which is an outstanding performer and retails for around $90.

You also can find plans on the Internet for a number of homebrew handheld satellite antennas. Just do a Web search using "homebrew handheld satellite antenna," and you might be surprised at the results. One of my "Duracell Experiment" contacts came with WB8LZG in Michigan. Gregg built his dual-band handheld yagi using a wooden hockey stick for a boom and coat hangers for elements. He sounded great when we worked, and I am on the lookout for an old wooden hockey stick to build my own version of his antenna.

There also are a number of "duck" style and whip antennas that work better than you might expect for satellite operation. I have personally completed contacts using the MFJ 1715 and 1717 "duck" style antennas, the Pryme AL800 telescoping whip and the Diamond SRH-789 telescoping whip.

I took a quick break from writing this feature to work a pass of SO-50 using the VX-7R at 5 watts out and the SRH-789. In less than five minutes of operation, I worked stations in Arkansas (Bob, AJ5C), Florida (Dave, K4DLG, also handheld), Tennessee (Rick, WA4NVM, who was mobile) and Georgia (Dusty, NR4N, also handheld). Shortly after the pass, I got an email from another Florida station (David, KG4ZLB) who heard me work K4DLG.

"I was running just half a watt into SO-50 and have had some success—yesterday and today with NR4N," he wrote, "so when it's not that busy, just half a watt into the bird works well!"

He's right, and it's also possible to make good contacts on very low power even when the satellites are busy. My "Duracell Experiment" is an example. Another is the contact I had with Mike, WB9L, in Indiana, on SO-50 at 21:42 UTC on August 26, 2008. Using the VX-7R, I was running 0.05 watt into the AL800 telescoping whip.

Contacts like that one keep me as excited as I've ever been about QRP. The icing on the cake for me is that I'm doing it in space via a satellite. How cool is that?!

The MFJ antennas retail for less than $25. The Pryme and Diamond whips each sell for $34.95—at HRO, at least. That's not a big investment.

As mentioned at the start of this story, even the standard-issue duck-style antenna supplied with the FT-817ND will get your signal into orbit. As I was writing this piece, it occurred to me that I hadn't tried a pass with this setup—so I did. During the 12:25-ish UTC pass of AO-51 on December 4, 2008, I worked New York (Pete, WB2OQQ) with the satellite at 24 degrees elevation to my northeast. Before the pass ended, I also worked Tennessee (Rick, WA4NVM, in Memphis) and Venezuela (Pedro, YV6PM, in Barcelona, which is on the northern coast east of Caracas).

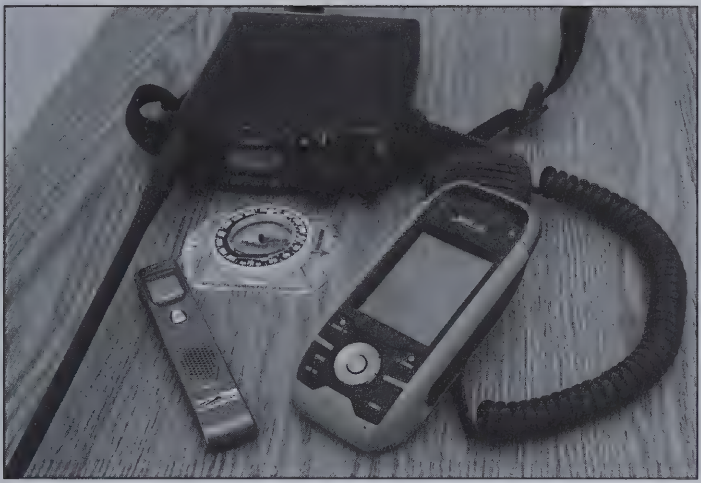
One of the reasons I promote handheld satellite operation so much is its potential to attract new operators—especially young ones. Tell a parent that you could have his or her son or daughter making amateur radio contacts in outer space using a station that costs less than an xBox 360 game console and 2-3 games for it, and see the reaction you get. It really is possible to build a complete and effective QRP handheld satellite station that inexpensively.

This is a complete and effective QRP station for working the FM LEO satellites. The antenna on the HT is Diamond's SRH-789. Other similar HT antennas that will work include the Pryme AL800 and MFJ Models 1715 and 1717. The author has made multiple QRP satellite contacts with each of these small, inexpensive antennas.

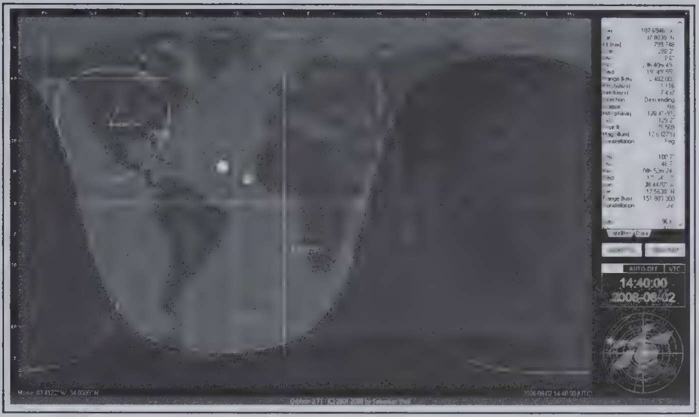
The only other information you need is the maidenhead grid square of the location you're operating from, and a schedule of when and where to be listening for the satellites—and you can get that information without spending a penny.

The AMSAT-NA and ARRL Web sites have grid square locators available, and the AMSAT-NA Web site provides a prediction utility that will show you the times, elevations and azimuth positions of all the satellites currently in orbit. All you need are your latitude and longitude coordinates. You can even get them online if you don't own a GPS unit.

I can't stress enough the need to pinpoint your grid square. Many Web sites will default to the grid square associated with the Zip Code of your station address as provided by the FCC. When I first looked online, multiple "lookup" sites had me listed in grid EM83 because of my Zip Code. When I entered the exact coordinate



The FT-817ND version of a complete handheld satellite station includes the standard-issue duck antenna from Yaesu.



This screen shot from Orbitron tracking software shows the relative position of Satellite AO-51 and the N3TL QRP station during a contact with KC9ELU. At 0.05-watts, that's 49,640.06 km (30,844.9 miles) per watt to reach the satellite.

of my home, however, I learned that I'm just across the border—literally—in EM84. The grid border is less than 100 yards south of my home. It'll pay you to confirm your grid square because satellite contacts routinely include the exchange of grids between stations.

When it comes to knowing when satellites are overhead, the AMSAT satellite-pass predictor will show you the time and azimuth prediction for acquisition of signal (AOS) (i.e., when the satellite you want to work rises above the horizon at your location), the time and azimuth position of maximum elevation during that pass (including that maximum elevation, in degrees above the horizon), and the time and azimuth position of loss of signal (LOS) (i.e., when the satellite sets at your location).

You can use that data to follow the satellite across the sky on a given pass. The FM satellites won't require you to tune your uplink frequency to compensate for Doppler shift, but you will have to tune for Doppler on the downlink side. The rule of thumb is to start on 10 kHz above the centre of the receive frequency and tune down as signals get noisy. You'll tune down through the center receive frequency to about 10 kHz below it at the end of the pass.

Let's use AO-51 as an example. I leave my transmit VFO on the VX-7R or FT-817 set at 145.920, but my receive VFO is set at 435.310 at the start of the pass. As time passes, the signals will begin to get noisy, so I step down to 435.305, then 435.300, and so on down to 435.290 as the pass nears its end for me.

On lower-angle passes (e.g., when maximum elevation doesn't get above 20-or-so degrees), I don't get as much time in the footprint. As a result, I generally start hearing stations at 5 kHz above center frequency and lose them at 5 kHz below. Every location will be slightly different, so experiment where you live.

You simply need to be able to operate semi-duplex. Full duplex is preferred because it reduces multiple/simultaneous transmissions (i.e., operators can avoid "stepping on each other" when trying to make contacts) and a blank downlink. Sadly, however, HTs capable of full duplex operation have virtually disappeared from current production lineups, and that's a shame.

When it comes to locating and tracking satellites, there also are software packages readily available that will let you do it on your computer. Some are freeware, others —like SatPC32—charge a licensing fee. In the case of SatPC32, however, that fee goes to AMSAT-NA to support its ongoing mission of keeping amateur radio in space.

Some software also provides computer control of frequencies and antenna rotators, but that's all fodder for another story.

All you really need to work QRP magic on the satellites is one of the radios mated with one of the antennas described earlier. I have added three other items to fully complete my QRP satellite station: a handheld GPS unit, a compass and a digital audio recorder. The GPS unit provides precise location anywhere, so you can confirm your grid square. The compass help you plot a satellite pass and be as accurate as possible when manual tracking. Just pick landmarks that correspond with the azimuth coordinates for AOS, mid pass and LOS, and locate the angle of mid-pass elevation. With these landmarks, you can visualize the satellite's path across the sky and keep your antenna pointed exactly where it needs to be.

Logging is tough with a handheld station, unless you have a digital recorder. Start it on the minute that a pass starts (e.g., if AOS is at 20:36:45 UTC, start the recorder at 20:36:00). You can replay the recording after the pass to get precise times for your log, and to confirm call signs and grid squares.

The Bottom Line

We're not at the best point in the sunspot cycle, are we? What if you could stand in your front yard and, over the course of 10 minutes, make QRP contacts with stations from Canada to Mexico and all points in between on an HT running at QRP power levels? And what if you could do that using a satellite in orbit?

You can. And if you enjoy QRP as much as I do, you should. It's a hoot!

Resources

1. AMSAT - http://www.amsat.org
2. ARISS - http://ariss.org
3. "Down to Earth Satellite Communications," is a wonderful tutorial written by Richard Hackney, N1ASA (SK). Get it in PDF form at: http://www.wku.edu/ksgc/sats.pdf

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Antennas 101: How Many Radials

Gary Breed—K9AY k9ay@k9ay.com

It's winter time and many hams have been active on the low bands. On 160 meters, vertical antennas (including inverted-Ls) are common antennas, although there are many dipoles and horizontal loops, as well. 80M antennas include both verticals and dipoles, along with some delta loops and other designs.

On 80 and 160, a vertical is the best antenna for everything but very close-in contacts, unless you can get a horizontal antenna installed at 1/2-wavelength height (or higher). Very few QRPers will have a 140-foot tower for their 80M dipole, much less a tall enough tower (with obstruction lighting) for 160M!

Verticals Need Radials

Once you have decided to build a vertical antenna, the question arises, "How many radials do I need?" This question needs an answer, no matter what the actual antenna design. The vertical antenna is only part of the electrical circuit. If we think of it as "half a dipole" then where is the other half? It's the "ground" or "radial" or "counterpoise" system. Hams use the term radials because the most common way to build it is to install wires radially outward from the base of the antenna. We need radials because the earth alone is a poor conductor. Salt water is the only natural alternative to a good radial system!

There are two ways to think of the radial system. The first is like an electrical circuit, where the currents delivered by the feedline flow between the antenna and the radial system (Figure 1). Intuitively, we understand that a poor radial system with high RF resistance will create losses, according to:

$$P_{loss} = I_{ant}^{2} \times R_{loss}$$

and, of course, we want R_{loss} to be as low as possible (or practical).

The second way to look at radials is from a radiated energy perspective. Here, the job of the radials is to provide a return path for the "displacement currents" initiated by fields radiated from the vertical element (Figure 2). The best intuitive explanation of this behavior is that the radials provide something for the radiate currents to "push against," as if the vertical and radials are the two plates of a capacitor, with an electric field between them

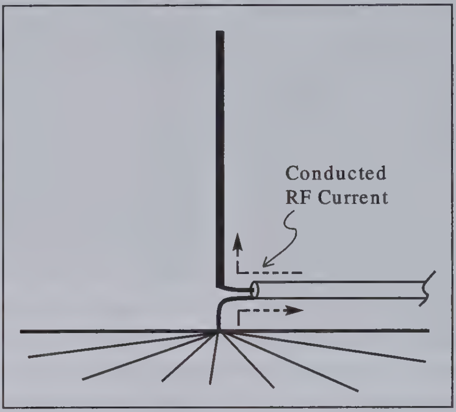

Figure 1—RF conducted currents flow from feedline to the vertical radiator and the ground system.

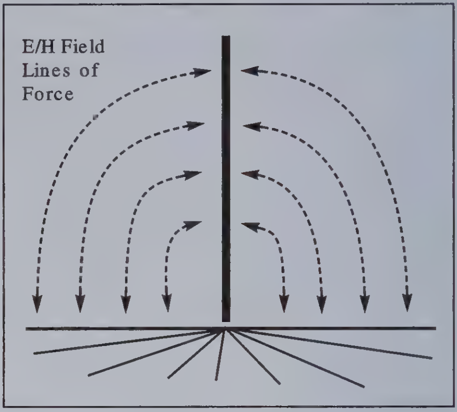

Figure 2—RF radiated currents create energy fields between the vertical radiator and the ground system.

Some History

Back in the 1930s, a great deal of research and experimentation was done to establish technical standards for AM broadcast stations, including a proscribed method for building a radial system. That research determined that a system of 120 1/4-wavelength buried radials would result in a ground system loss of less than one ohm.

What many hams don't realize is that 120-radial standard was not the only one put into place. That early work also established different procedures for the "clear channel" stations that used taller vertical antennas—usually 5/8-wave—and required even more extensive radial systems that included 1/2-wave radials.

More recently, hams have added to, and adapted these early guidelines using their own research. Some of the most significant work was done by Al Christman, K3LC, Eric Gustafson N7CL, Rudy Severns N6LF, Roy Lewallen W7EL and Tom Rauch W8JI. Many others have made useful contributions to the subject, as well. I've included a few references at the end of this article.

Hopefully, I can summarize the major findings of all that work, as it applies to typical ham installations, from a small back yard to nearly unlimited acreage.

How Many Radials?

One conclusion of ALL of the reseach is that more radials is better, but at some point, the improvement gained by adding more radials becomes so small that the extra work may not be justified.

Where is that cutoff point? It depends on your objectives, and is also depends on the nature of your own installation.

1) When you cannot install 1/4-wave radial lengths

In a city or suburban lot, few hams have enough space to install many long radials. The area inside a circle of 160M 1/4-wave radials is about 1.3 acres! Even on 80M, 1/4-wave radials are 70 feet long and a "full" radial system won't fit on city or suburban lots.

In this case, the answer to the question, "How many?" is, "As many as you can." Yes, you will need to route them around the house and garage, avoiding trees, getting under shrubs, and dealing with sidewalks and driveways. Your goal is to make the conducting area of the "capacitor plate" as large as is practical at your QTH.

Because you are probably using the yard for other things, I hightly recommend burying the radial wires. This also avoids interfering with mowing. A lawn edger works well for slicing the sod. If you are more patient, and don't need to worry about children and pets, you can cut the grass extremely short and lay the radials tight to the ground. As the lawn re-grows,

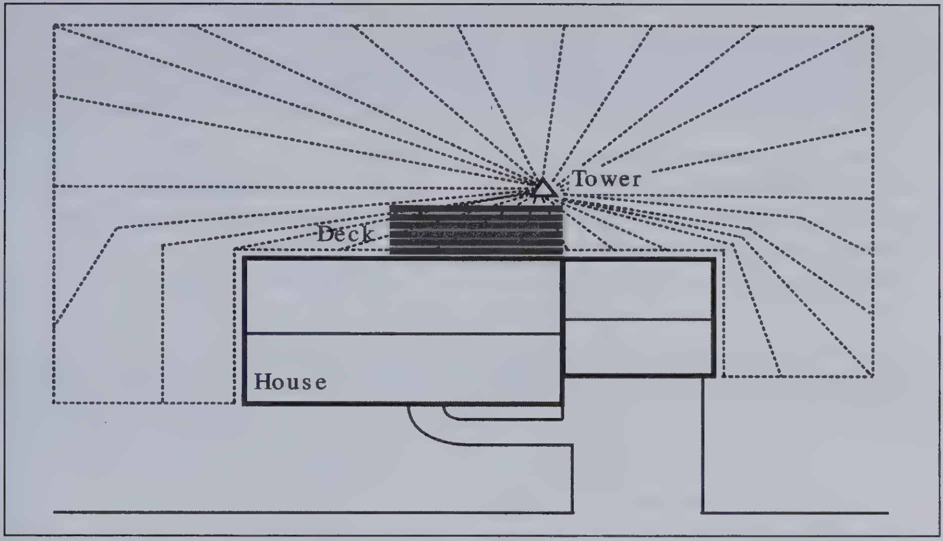

Figure 3—An example of a radial system on a city lot QTH. This ham's radials are in the back and side yards, avoiding the front yard's flowers and shrubs.

1. Average Ground

No. of Radials	λ/4 Long Gain (dBi)	λ/8 Long Gain (dBi)
4	–0.62	–0.63
8	–0.15	–0.50
16	+0.55	+0.32
32	+0.94	+0.66
64	+1.28	+0.92
120	+1.51	+1.05

2. Very Good Ground

No. of Radials	λ/4 Long Gain (dBi)	λ/8 Long Gain (dBi)
4	+1.98	+1.97
8	+2.22	+2.22
16	+2.41	+2.40
32	+2.59	+2.55
64	+2.76	+2.70
120	+2.87	+2.78

Table 1—160M vertical performance vs. number of buried radials.

the radials will disappear under the "thatch" that the grass and clippings create.

Figure 3 is diagram of one ham's installation for this type of installation. In this example, the ham ended up with about 50 radials of various lengths, and he chose to connect them all to a perimeter wire. The perimeter wire may not add much to a full-size radial system's performance, but the experience of hams like this one suggests that it helps with short radials.

2) When you have enough space for full-size radials

If your station has enough space for 1/4-wave radials, how do you best use your time and keep the cost of wire from becoming excessive? In other words, when do you stop adding radials?

Look at Table 1. From this list we can easily see that, for average ground, the rate of improvement is quite rapid with few radials, decreasing as we have more radials. From 4 to 16 radials, the improvement is more than 1 dB, which is the same as using 20% more power. To get another dB, you'll need to increase from 16 to 120 radials, which will take significant effort and cost—but you may choose to do it for top performance.

Table 1 also shows how radials perform with very good ground (high conductivity). Here, you can use shorter radials, and fewer of them. Unfortunately, very few hams live in places with this type of soil beneath them! I should also note that with very poor ground, the need for more, longer radials is quite pronounced.

Finally, this table is not the last word. It is considered to be a generally good comparison, however, the on-air difference between four buried radials and 120 radials is widely considred to be greater than the 2 dB indicated by this table, which was created by computer modeling. It makes sense that other factors are involved.

What About Elevated Radials?

There is some controversy over the performance of elevated radials versus a buried (or lying on the ground) radial system. Mainly, there are very few side-by-side comparisons of these systems on which to make a judgement. Rather than go into detail, I will make some observations that are accepted as being accurate:

1. Elevated radials can work well—They work best when, like buried radials, there are many of them. They also work best when they are an appreciable fraction of a wavelength above ground. (λ/20 minimum, λ/10 preferred). In general, to get equal performance, fewer elevated radials are needed as their height is increased.

The operation of radials in the presence of lossy earth can be viewed as "shielding" the RF currents from earth, where some of the energy will be absorbed. Of course, a larger number of radials comes closer to being a complete shield, whether elevated or buried. Elevating radials above ground also provides isolation by using the distance between the radials and earth to reduce earth currents.

2. Four elevated radials are not as good as a full buried ground system—There were early reports claiming that four elevated radials were as good as a large buried system, but at least one of these claims was based on flawed data. It has now been determined that four elevated radials will come close if they are 0.1 wavelength above ground (54 feet at 160M), but remember that the vertical portion must also be raised by the same amount for this comparison to be valid.

I have personal experience with 40M ground planes. My first installation had the feedpoint at 30 feet, with radials sloping down from that height, and the vertical portion extending 1/4-wave above. This worked very well. Later, I re-installed the same vertical with four elevated radials at about 6-foot height, which clearly did not work as well.

The bottom line is that you need radials for a vertical antenna. How many, and in what configuration will mainly be a practical choice, based on your personal objectives and site limitations.

Further Reading

1. *The ARRL Antenna Book*

2. J. Devoldere, ON4UN, *Low Band DXing,"* 4th Edition, published by ARRL.

3. A. Christman, K3LC—Search for his numerous articles in *QST*, *QEX* and *National Contest Journal* (*NCJ*). ●●

HF Antennas for Roger da NueHamme

Jay Slough—K4ZLE k4zle@yahoo.com

This short article is intended to codify some thoughts on choosing an HF antenna. Specifically, it is intended to help a new HF operator choose an antenna where a tower and/or beam may not be options. Given a choice, I almost always recommend the tower and beam solution. The thoughts herein expressed are mine and result in years of experience, reading, observing, and jawboning with others with more experience than I. This is essentially the talk sheet that accompanied a presentation to the Cincinnati FM Club in August 2000, where I also had physical examples of many simple wire antennas for them to fondle. There is much to consider when choosing an antenna. Let's begin.

EDUCATE Yourself

Ignorance is not bliss; ignorance is ignominious. Knowledge is necessary.

Know your operating preferences—When choosing an antenna you should consider your intended operating modus operandi. For instance, if you prefer to operate 10M, but only have evenings and nights free, you may as well not install anything extensive at home. For you, it might be more practical to install your radio in the car and be a "commuter communicator." I know hams who have worked the world from their car. (Given the above operating preferences and with sunspots where they are now, you probably should consider Echolink as a more viable alternative!)

Assuming your available time and bands match reality, you must decide, who is your intended audience? For example, I would use a different type antenna for close in 160M work than one for DX on the same band.

Know your environment—What is the physical environment? How much room do you have to work with? What existing structures are available to aid and abet or to cause you to abort? Are there power lines in the vicinity? Always remember SAFETY!

What is the legal environment? What are the local government's ordinances? Are there any existing covenants, zoning restrictions or deed restrictions that may limit your choice? Will certain antennas and power combinations put you in violation of radiation exposure limit considerations? Would placement of certain antennas or their components exacerbate liability risks and are they worth those risks?

What is the spousal environment? Remember, what is aesthetically pleasing to you is not necessarily appealing to the spouse!

Know your subject—If you do not have access to at least one antenna handbook or the *ARRL Handbook*, you should! Whether we are talking ham radio or any other subject, education is not a one time event; it is a life-long process. If you do not subscribe to at least one other ham magazine you should. There is an excellent web based magazine, *AntenneX*, for those who develop a deeper interest. I have found many excellent articles exclusively available, or available first, on the internet on various ham related topics, including antennas. Engage in technical discussions on the air about the other guys experience with different antennas. Here is where you need some education to know when the other guy knows what he is talking about or not.

Know your limitations—Know what you know—and know what you *don't* know. Never extend yourself where safety is involved. Ham radio is only a hobby. I have already lost one friend who fell from his tower. I don't want to lose any more. If you don't know something; find out. Real hams *do* seek assistance.

INITIATE Action

Do something. In an attempt to educate yourself, do not engage in "analysis paralysis." Any antenna is better than no antenna at all. Almost any conducting object can be made to radiate some RF energy. As a novice, I made several contacts on 40M just using a 60W incandescent light bulb. Theoretically, you can lose half your power in a poor antenna and not be down a full S-unit.

After you get on the air, gain some experience, talk with other hams and you learn what your true operating preferences are, you can modify or change your antenna system. I was once accused of changing antennas like some people change socks—once a month!

ELEVATE

Some light-hearted, but true, rules of thumb for antennas are:

- Height makes might
- When choosing sides, always choose outside
- Bigger is better; small antennas (in terms of wavelength) = small performance
- In the clear means fewer tears

ELIMINATE Complexity

Follow the KISS principle and keep it simple. Generally, a single band antenna is less complex, and more efficient, than a multiband antenna. Use existing structures, if possible—with obvious enhancements to achieve other objectives. Add a small mast to the eaves of the house to gain height, try again if your throw didn't get the rope over the top tree branch, etc.

For most of us, a horizontal wire is more efficient than a vertical, because of the problems in constructing a suitable ground or counterpoise to achieve comparable results. The major exception to this 'rule' is on 160, 80 or 40M, especially in the realm of DXing. It may be better to use the vertical because of horizontal space limitations and the lower angle of radiation achieved.

For most simple antennas, a tuner is a must for multiband operation. And using the tuner with open feed line is much more flexible and efficient than traps or intricate switching configurations.

INNOVATE

Try some "different" things. Here are a few examples of antennas with minimal visual impact:

1) A flag pole vertical.
2) Load your gutters. I measured mine at a previous house and the length of the top gutters was almost resonant on 30M. The spacing between the front of the house and the rear was 0.2 wavelengths for that band. That could have made a pretty good 2 element Yagi. With careful planning I could have added switching to favor two different directions.

3) Think temporary antenna versus permanent, or maybe try one that tilts over and "pops up" on demand. (This is especially good for nighttime operating!)
4) Use camouflage to hide your vertical. I know someone who painted his GAP vertical to blend in with the bushes he had planted nearby.
5) Use thin wire, or dark-colored insulated wire.
6) If you have cable, but the old outside TV antenna still exists, use the TV antenna and mast as a tophat vertical. The antenna and mast could be for one band and the old 300 ohm feedline or 72 ohm coax—properly isolated—could be for another one.

OPERATE

Lastly, just get off your duff and do your stuff! Put something up. Put anything up. Get on the air and enjoy the joy of operating! ●●

The Allure of Top Band—Birth of the WindoVert

Jeff Smith—VE1ZAC

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Need a DX challenge at the bottom of the sunspot cycle? It always comes down to this… Top Band! It has propagation characteristics all its own. It's elusive and maddening. It's like an itch that has to be scratched. Plus, 160M means a half wave length is a whopping 262 feet! When you live in an urban area, that is a monstrous number. 262 feet for a dipole! 130 feet straight up for a vertical or the proper height for a wire. How on earth can you deal with this from a city lot?

Turns out, there are plenty of ways, but they are all "Compromises." Huge surprise, eh? And yet again, antenna modeling with EZNEC comes to the rescue.

Height is really the key factor for 160M, and next to that is horizontal space. I say height is the priority because even if you want to use a shortened horizontal antenna, you still have to get it up pretty high if you want to do anything other than warm clouds. So… height? Yup, we gotta get up there somehow. To compound the problem, height has some serious issues of exponentially escalating costs and risks.

Well, after the hurricane that hit Halifax in 2003, my inventory of antenna supports was seriously depleted. I wound up building a new 50 ft. wooden mast that is supported by a fairly healthy pine tree. My favorite Carolina 80M Windom (trademark of Radio Works, Inc.) is supported at the balun by this mast. The feed line and isolator hang below this. I love this antenna! I have had various versions of Radio Works antennas for years and they have always been stellar performers. In my opinion, they are the best bang for the buck for a commercial multi-band single wire antenna. However, they are a technical ham's antenna, not a simple plug and play antenna for the "appliance operator" crowd. Careful attention to the manual and installation needs is essential for satisfactory performance. With that caveat, I heartily endorse them for multiband antenna installations.

However, while this antenna works very well at 80M, it is still less than optimum height for good low angle radiation, which is why I also have a short 80M vertical to use when needed. On 40M and above, the Windom works very very well. I use it for a horizontal antenna on all bands 80M and up, also have verticals to work with for 80, 40 and 30M, and a 2-element SteppIR beam for 20M and up. A nice collection of antennas for DXing with proven results. Fairly often, I operate QRP using these antennas often with decent results. When needed I can bring an extra 600 watts to the frontline with a little home-made amplifier. All this seems to work very well for me. If I can hear DX, I can usually work it.

Except, of course, 160M. ...Sigh…

This one is a problem. So, last year I looked into, and built, a very successful short reversible Beverage (or SWA) that really helped hear on 160M. I took it down in the summer but intend to put it back up in the fall (now) for winter DXing. It is kind of in the way in my yard.

Now, what to do about transmitting. I am primarily interested in DX signals, so low angle is the target. That means a vertical. What can I do for a vertical? Well, I do have this nice 50 foot feed line for the Windom hanging down from 132 feet of wire. If I could make that work as a vertical radiator with a capacity hat, I might have myself a Marconi style "T" antenna. That would need a few radials to work at all. Let's start with the radials. What can I fit in my yard... hmmmm, maybe four or five 60 footers. Not a perfect radial field, but a start.

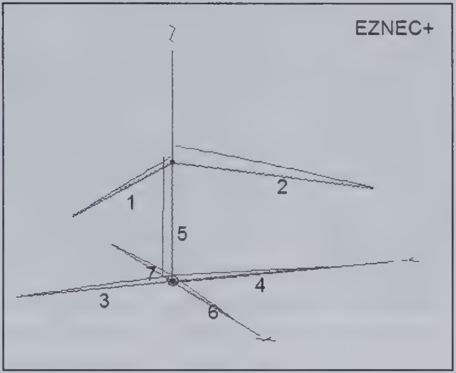

Figure 1—EZNEC Model for a Basic Windom Antenna, Operated as a Vertical. [*Not the best illustration in black-and-white, but we think you'll get the idea —Editor*]

And now, it's time to fire up EZNEC and see what happens. I know the dimensions of the top wires, and the feed line is made of coax. If we short the shield and center together at the bottom, it should look like a .250" diameter wire element. To start, we will just show a single connection to the top wire and see what the radiation looks like. In reality, there is a transformer and isolator in the feedline that will have to eventually be brought into the picture. Figure 1 is the EZNEC view, with the currents indicated on the conductors.

Note the large current on the vertical feed line. This is typical of a vertical antenna. And, if we look at the 3D radiation pattern, it has a bit of gain in one direction but little radiation overhead. The model's predicted feed point impedance is 9 –j84 ohms. A small real R of 9 ohms fits with a very short vertical antenna. Ditto the capacitive reactance of –84 ohms, for a

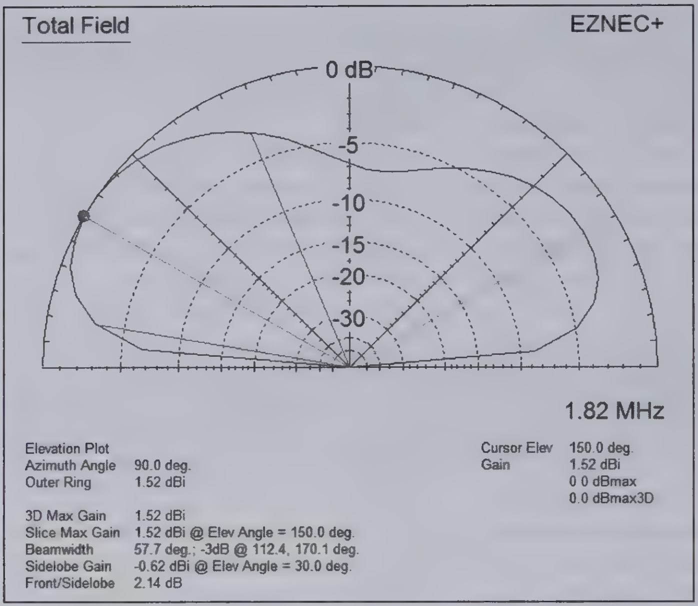

Figure 2—Predicted elevation pattern for the antenna of Figure 1.

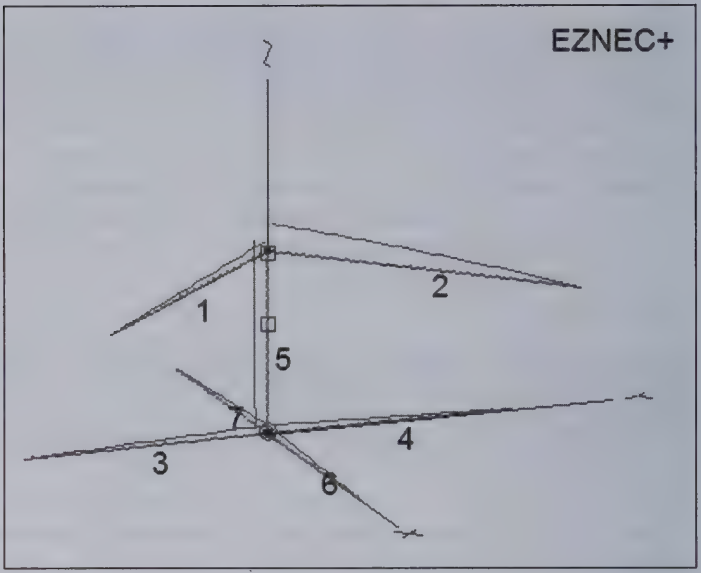

Figure 3—EZNEC model for the Carolina Windom, including the balun and line isolator inductances, indicated by the square boxes in the center and at the top of Wire 5.

short antenna. According to this complex impedance, a loading coil with 84 ohms reactance would resonate the antenna, and all we would have to do is deal with the low radiation resistance of 9 ohms.

If only life were this simple! (Sigh, again) Now we have to look at reality.

Next step is to realize we actually have lots of ground loss resistance and some inline inductance to deal with. So, it's time to dig out the analyzer and see what we really measure. I did roll out some radials, five in this case and I can verify that they aren't very good. I expect very significant ground loss and efficiency issues. I have an Autek RF-1 which gives typical results for a simple instrument. When hooked onto the shorted feedline and the newly minted radials, we get 74 +j190 ohms.

And, the resonant frequency is 1.46 MHz. What the...??? Obviously there *is* some inductance in those built in antenna devices. This antenna has a line isolator mounted 20 feet below the antenna and a customized balun at the antenna. Those devices are clearly helping our cause, because now we have an electrically long antenna that is resonate way below 1.82 MHz (where I measured everything). This is very good news! BTW, the analyzer also shows a needed inductance of 18 uH and a capacitor of 409 pF to bring it into our 160M world. Remember those values for later!

Let's see if we can figure out what's inside. Turns out I have a (convenient) spare 80M Windom stored in my shop. Putting my analyzer in "L" measuring mode to that unit shows the series inductance of the midline isolator to be about 19 uH, or 217 ohms reactance. The balun at the top is a little more complicated, but I estimate the inductance to be 1.5 uH and 17 ohms reactance.

Now we can plug that into the model and see what changes. Yes, we can insert lumped components into EZNEC models for just this eventuality. Figure 3 shows the results for the new model.

This looks OK. There are no weird discontinuities around the two added loads, which are shown as the square boxes in the model. The new predicted impedance is 17 +j177, which is much closer to our measured value. In fact, the reactance part is very close. Why do we show only 17 ohms for the Real part, instead of the measured 74 ohms? Well, that's the bad news part. The model, in this case, doesn't predict the ground losses. They are real however, and are added to the radiation resistance of about 17 ohms. Unfortunately, that means we have pretty big losses in the ground. I am not going to deal with that right now, but want to get this puppy on the air and see what's happening. I didn't do it here, but we could estimate the value of the capacity hat on top by looking at the difference in Z for a simple 48 foot vertical and calculating the value that the top C must be to get us where we are.

The model is also useful to probe around those loads during actual use and see what sort of torture we are applying. Turns out I have a built in limit of about 600 watts, so applying that at the feed point shows the total coil losses of about 1.6 dB and a maximum voltage across the isolator reactance of about 1000 volts. That shouldn't fry the unit, but if it does, it's easy to replace. Putting 1500 watts on this puppy could do some real damage though. No problems with QRP of course. Caveat Emptor.

What else do we have to worry about before trying this out? I have (had) another small 40M Windom mounted on this same mast, about 6 feet below the big one. I can show those wires in the model. There is a suspicion that capacity wires mounted lower down the center conductor could alter the characteristics of the radiation pattern. And sure enough, it does. It looks like that is going to cost us a few dB in output. I wasn't using this antenna anyway, so down it comes.

The match is produced after digging around in the junk box. A variable cap is put in series with the antenna and the analyzer and adjusted for the lowest Z I can get on 1.82 MHz. Turns out to be 384 pF in series. That leaves the R of 74 ohms to deal with, and a variable inductor is inserted to ground (shunt) at the transmission line and

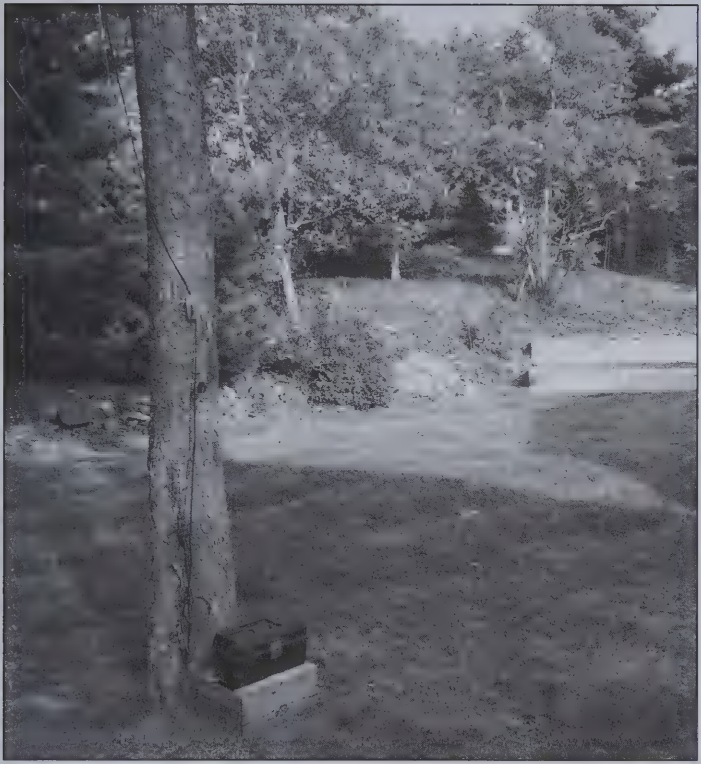

Figure 4—The matching network, installed at the bottom of the Carolina Windom's "natural support structure."

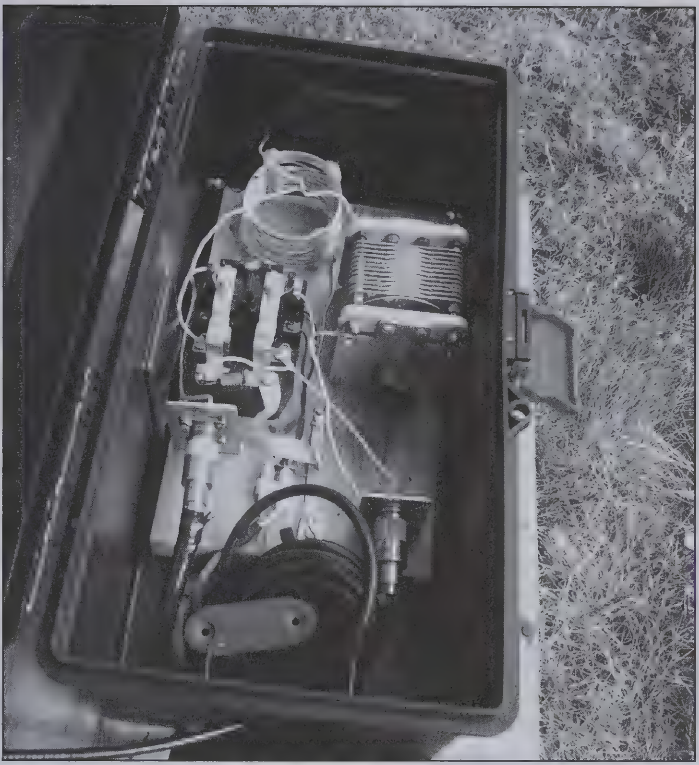

Figure 5—A look inside the matching network case shows howthe matching and switching components are arranged.

adjusted for a low SWR for 50 ohms. That value turns out to be 13 uH. Note how close those are to the analyzer numbers referred to earlier. As shown in Figure 4, a cheapy tool box makes a nice housing for the unit, which includes a relay to allow it to switch between normal Windom mode and the new "Windovert" mode from inside the shack. Plus a great "honkin" choke for the transmission line, and voila.. we have a match !

Note also the "Cutty Sark" crate platform at the base of the tree... a key element to good DX on this antenna!

Inside, as shown in Figure 5, you can see the doings that make up the L match. Since there is a series capacitor in line with the feed line, I felt it prudent to install a 100 mH choke across this cap to provide a DC ground for static. A large wattage and high value resistor would also work. The choke is very high Z at 1.82 MHz and won't affect the signal.

Performance is a treat! By gosh, it works wonderfully. It hears well and transmits just fine. I have only tried it with a few Eu and West Coast contacts so far, but it seems to do everything I need. How nice to finally be able to transmit properly on 160M! But wait, there's more! I accidentally discovered this thing performs well on 30M too! It works much better than my existing 30M vertical, and that isn't surprising, considering it has more physical length. In fact, it's almost a half-wavelength on 30M, and the feed point match still works perfectly. THAT is a happy coincidence.

My last modification was to move my short beverage away from the base of the antenna. In fact, I have since deleted this beverage from my collection and made it a Beverage on Ground (BOG) antenna which gives good results on 160 when used with a phase control device. Normally, the "WindoVert" by itself is the antenna of choice. It does make QRP contacts, although any QRP on 160 is a challenge.

If you are looking to get on 160 from a small yard, and have a Windom or a dipole that can be converted to a Marconi style antenna, this could be your best bet for a simple antenna.

Good luck with your antenna projects.. hope to hear you on the low bands.

FDIM XIV 2009

Are YOU coming to FDIM 2009?

Start planning now! See the Preview and Registration info starting on page 11

QRP Contests

Jeff Heatherington—VA3JFF

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As we enter into 2009 the world is a very different place than it was even a few short years ago. The times are changing, our beliefs and values are changing, our expectations of others and ourselves are changing, and our responsibility to the world as a whole is changing. Last year, my employer introduced a personal and voluntary program for all the employees. We were challenged to make the world a better place through a series of small actions that were dubbed Personal Sustainability Plans (PSP). The idea was that with 70,000 employees across Canada all making small contributions, and more than a million employees around the world making similar contributions to society, that the world would be a better place for us all to enjoy. These actions could be as simple as car-pooling to work, or bringing in a mug for our coffee breaks instead of using and disposing of Styrofoam cups. Many employees talk of increased recycling and composting efforts, quitting smoking, walking around the parking lot on lunches, and others about conservation and recycling water around the house.

My first PSP was more ambitious than most and garnered a lot of attention around the store. I was asked to talk about my plan at meetings and gatherings, and I am often asked about my progress. My PSP is to not be a burden on the electrical grid system while participating in my favourite hobby of amateur radio. While I'm not talking about anything new, and I haven't done anything that has been done by others, it was something a little different around the retail world. I have a simple system in place really. It's just a solar panel that is fed to a charge regulator and the output to a gelled electrolyte battery. The battery is almost always fully charged except when I get involved in a heavy duty contest, and powers my station for transmit and receive. In 2009, I will be increasing my efforts in this area, and will have a power inverter running from a larger battery source to allow me to power my station computer and a small LED desk lamp from the same sustainable and off-grid power source.

Now while my efforts are all well and good, you may be asking yourself why I'm taking up good space in a contest column to tell you about them. The tie-in to contesting is a new contest that is being experimented with in Japan. The JARL QRP Club is promoting a new way of thinking and is talking about the "Total Power" used in achieving communications. Their 2009 Ultimate QRP Competition is going to be for 2m FM communications and, as long as they achieve some success, they plan on expanding to 21 MHz SSB in 2010! "Total Power" is defined as the total power consumed by ALL equipment used to establish communications. This includes the transmitter, receiver, and other peripherals such as heaters for vacuum tubes, power draw for electric keyers, counters, computers and so on. We are all invited to participate and join in on the fun on 2m FM in 2009 and hopefully on the HF bands in the future. More information can be found on the club website at http://www.jaqrp.org/ and in the accompanying side bar article (*page 50*).

Contest Results

As for our traditional QRP Contests, this quarter features one of our cornerstones in the Fall QSO Party but the first contest this quarter was the Silent Key Memorial Sprint that honours all of the QRPers that came before us. This year saw a spirited battle between QRP-ARCI contest regulars. Bob Patten—N4BP did manage to hold off Arnold Olean—K0ZK in the end for the championship. Bob managed 29,848 points for a 5,000 point victory. Ed Gilliland—W5TM took third place with 21,560 points and Will Bowser—K9FO scored 15,960 points and Tim Colbert—K3HX scored 11,860 point to round out the top five. September saw the final running of the End of Summer Digital Sprint. This contest has suffered with a lack of participation over the past years, and this year was no different. In 2009, the September time slot will be filled with the rescheduled VHF Contest. The final running of the Digital Sprint was one of the closest contests I have overseen with QRP-ARCI. Brian Kassel—K7RE edged Bob Patten—N4BP 15,372 points to 15,246 points for a difference of only 126 points! Paul Taylor—MM3OQR rounded out the top three from Europe with 28 points.

The Fall QSO Party is traditionally one of our busiest contests and there was lots of activity to be found this year as well. There were many new callsigns, the highest number of QRO entries in a contest that I have seen, and we also saw several multi-operator stations enter as checklogs and participate without submitting logs. It might be time to consider that category for future runnings of the Fall QSO Party as operators prepare for the coming fall contest season. Bob Patten—N4BP again took home the first place honours with 1,016,715 points, the only station to pass the magic million point barrier this year. Art Tolda—VE3UTT was the highest scoring Canadian in second place with 667,800 points leading a total of four usually higher powered Contest Club Ontario operators that finished in our top ten. Dick Housden—W0NTA took third place with 412,160 points edging out fourth place finisher Jim Lageson—N0UR at 405,972 points and first time ever QRPer Vladimir Milutinovic—VE3JM with 404,544 points in fifth place.

Until next time, keep your power down and your QSO rates up.

—73/72, Jeff, VA3JFF

Silent Key Memorial Sprint Top 5

N4BP–Bob Patten	29,848 pts
K0ZK–Arnold Olean	24,152 pts
W5TM–Ed Gilliland	21,560 pts
K9FO–Will Bowser	15,960 pts
K3HX–Tim Colbert	11,860 pts

Silent Key Memorial Contest Soapbox

Horrible conditions. Hurry Sunspots!—**N4BP**. Portable from Parsons Beach Pathway—**K0ZK**. Enjoyed the contest eventhough bands were not too good. It's time to get antennas ready for the Top Band Sprint!—**K9FO**. Portable operations from RV-Van in Orbisonia,

Silent Key Memorial Sprint Results

Call	State	Bands	Power	QSOs	Pts	SPC	Mult	Bonus	Score	Rig	Antenna
N4BP	FL	ALL	< 5W	40	164	26	7	0	29848	K2	A4S, 40/80 Armadillo Trap Dipole
K0ZK	ME	20	< 5W		144	19	7	5000	24152	K2	Hustler 6BTV
W5TM	OK	20	< 5W		140	22	7	0	21560	K3	C3 2 stack
K9FO	IL	20/40	< 5W	27	120	19	7		15960	Orion	Dipoles
K3HX	PA	20/40	< 5W	17	70	14	7	5000	11860	IC706	Inv Vee Fan
K4KSR	VA	ALL	< 5W		74	13	7	5000	11734	K1	HB packemup vertical
N6DIT	CA	20	< 5W	11	46	9	7	5000	7898	KX1	3 phase colinear (mystery)
AI2T	NY	20/40	< 5W	10	8	44	7	5000	7464	K1	Random Wire
W9TFC	WI	20	< 5W	6	30	5	7	5000	6050	K1	Wire dipole
WU7R	MT	20	< 5W	3	9	3	7	5000	5189	KX1	1/2 wave diople
W5TA	TX	20/40	< 5W		67	9	7	0	4221		
NG7Z	WA	20	< 5W		44	7	7	0	2156	IC756 Pro 3	7 ele yagi
WA1WQG	CT	40	< 5W		35	5	7	0	1225	OHR 100A	OCF Dipole
W5ESE	TX	20	< 5W	7	32	5	7	0	1120	Tkit 1320	100m HOHPL
W2JEK	NJ	20/40	< 5W		19	4	7	0	532	FT840	20m gnd plane; 40m dipole
N1LU	NH	20	< 5W	4	17	3	7	0	357	IC746	Cobra Ultralite
AB8FJ	OH	20	< 5W	3	15	3	7	0	315	Argonaut V	End-Fed Random Wire

Pa.—**K3HX**. Beautiful day in woods and a chance to exercise antenna and board changes for all 5 bands. But prop was SK. —**K4SKR**. Missed first half hour due to broken wire in my antenna tuner. Nice day here to be operating outdoors.—**AI2T**. Portable from 6500 ft—**WU7R**. Conditions at my QTH were horrible. The noise level was S5 on 20 meters. I'm sure there were more stations that I could not copy. Managed one QSO on 40 which had an even higher noise level. 15 meters was dead as a door nail. Gave up early. Hope the bands perk up this fall.—**W5TA**. Crummy conditions—**NG7Z**. Thanks for the contacts. I missed the first half of the contest owing to other obligations.— **W5ESE**

End of Summer Digital Sprint Top 3

K7RE–Brian Kassel	15,372 pts
N4BP–Bob Patten	15,246 pts
MM3OQR–Paul Taylor	28 pts

End of Summer Digital Sprint Results

Call	S-P-C	Bands	Power	QSOs	Pts	SPCs	Mult	Score	Rig	Antenna
K7RE	SD	20/40	< 5W	49	122	18	7	15372	SDR-1000	two 3 ele beams, 40m dipole
N4BP	FL	20	< 5W	35	99	22	7	15246	K3	
MM3OQR	Scotland	20	< 5W	1	4	1	7	28		

Fall QSO Party Top 10

N4BP–Bob Patten	1,016,715 pts
VE3UTT–Art Tolda	667,800 pts
W0NTA–Dick Housden	412,160 pts
N0UR–Jim Lageson	405,972 pts
VE3JM–Vladimir Milutinovic	404,544 pts
VA3NR–Chris Lorantfy	255,808 pts
VA3RKM–Robert MacKenzie	233,415 pts
W4FMS–Frank Scutch	211,680 pts
K4BAI–John T. Lainey III	165,585 pts
W8TM–Paul Kirley	161,868 pts

Fall QSO Party Soapbox

Hurry Sunspots!—N4BP. Conditions not so good in Colorado, but another fun time.—**W0NTA**. After 28 years of hamming, this was my first time to run QRP! I was using 5 watts and sometimes less!—**VE3JM**. Lots of fun. Very interesting propagation shifts as the weekend went on. —**VA3RKM**. Good member turn-out. Forty meters was very QRN, but 20 was open, 80 was excellent. Thanks to all participants.—**AI2T**. I started off running 50 mW, but nobody could copy, so I goosed the wick up to 250 mW, where stations started copying me. I was really impressed with the listening skills displayed by WD7Y (20M), VE2DEQ (80M), and W0NTA (80M). Folks like these set a standard of excellence.—**AA4XX**. Just had time for a few hours. Good to hear the bands coming back to life a bit. I hope for a better effort in the Spring QSO Party.—**K7TQ**. N3A was the Special Event call for the 3000th member of the North American QRP Club, celebrating the 4th anniversary of it's founding. There were 10 different stations on the air, one in each call area of the USA.—**K3WWP op., N3A/3**. My first QRP ARCI Contest. It was interesting. However, with the RTTY

2008 Fall QSO Party Results

Call	S-P-C	Bands	Power	QSOs	Pts	SPCs	Mult	Score	Rig & Antenna	Team
N4BP	FL	ALL	< 5W	310	1263	115	7	1016715	K3 + A4S, Armadillo Dipole, Inv-L	Aluminum Kings
VE3UTT	ON	ALL	< 5W	227	900	106	7	667800		Beaverboys #1
W0NTA	CO	ALL	< 5W		736	80	7	412160	K3 + 3 ele SteppIR and 80m dipole	
N0UR	MN	ALL	< 5W	168	716	81	7	405972	K2 + Yagi, Wires	Aluminum Kings
VE3JM	ON	ALL	< 5W	178	688	84	7	404544	FT1000MP, TS930S + tribander, rotary dipole, Inv V	Beaverboys #1
VA3NR	ON	ALL	< 5W	134	571	64	7	255808	FT1000MP Mark V + DXCC Dipole, HF6V Vertical	Beaverboys #2
VA3RKM	ON	ALL	< 5W		513	65	7	233415	K2 + 20m, 40m verticals, 80m, 160m wires	Beaverboys #1
W4FMS	MI	ALL	< 5W	114	504	60	7	211680		Aluminum Kings
K4BAI	FL	ALL	< 5W	95	415	57	7	165585	FT1000MP + TH6DXX, Dipole, Zepp, Inv Vee	Aluminum Kings
W8TM	OH	ALL	< 5W	114	492	47	7	161868	K3 + Inv Vee	
K3WW	PA	ALL	< 5W	101	444	52	7	161616	2x K3 + 80m vertical, 40-2CD, Bencher Skyhawk	EPA
VA3DF	ON	ALL	< 5W	96	426	47	7	140154		Beaverboys #1
AI2T	NY	ALL	< 5W	82	376	48	7	126336	K1 + Random Wire	
AA4XX	NC	ALL	< 250mW		247	32	15	118560	Argonaut II + Dipoles and 40m wire beam	
K7TQ	ID	ALL	< 5W	82	359	47	7	118111	K2 + Force 12 C4SXL, 80m half sloper	
N3A/3	PA	ALL	< 5W	90	384	43	7	115584	TS-480SAT + Attic Random Wire, Attic 20m Dipole	
K4PBY	FL	ALL	< 5W	81	354	42	7	104076	Argonaut + 80m inv vee	
HP1AC	HP	15/20	< 5W	66	300	49	7	102900	IC706 MkIIG + Rotary Dipole, TA31	
K9JWV	UT	ALL	< 1W		259	36	10	93240	IC703 + Gap Eagle Vertical	
W0RSP	SD	20/40	< 5W		336	38	7	89376	Sierra + Z-pole, dipole	
K4KSR	VA	ALL	< 5W		262	45	7	82530	K1 + Trapped Dipole, Inv L	
WA5RML	TX	ALL	< 5W		290	38	7	77140	Argonaut V + 40m dipole, 10-20 vertical	
N7RVD	CO	ALL	< 5W		240	41	7	68880	K2 + Hi-Q Screwdriver on RV Ladder	
KD2JC	NJ	ALL	< 5W		252	36	7	63504	K2 + 40m loop, G5RV	
W2JEK	NJ	ALL	< 5W	59	246	35	7	60270		
WD7Y	NV	20/40	< 5W	53	265	32	7	59360	Orion II + Butternut Vertical, Dipole	
WF7T	TN	ALL	< 5W	66	273	28	7	53508	FT857D + G5RV	
KB9BVN	IN	ALL	< 5W		235	32	7	52640	K2 + Attic Dipole	
K0LWV	MO	ALL	< 5W	47	208	33	7	48048	IC718 + Longwire vee beam, 80 dipole	
VE6BIR/3	ON	ALL	< 5W	46	212	32	7	47488	FT817 + Butternut HF6V Vertical	
W4SEC	FL	ALL	< 5W	46	208	32	7	46592	K2 + G5RV	
VE3KI	ON	ALL	< 5W	45	189	26	7	34398	K3 + Ground mounted 5-band trap vertical	Beaverboys #1
K0ZK	ME	ALL	< 5W	38	173	28	7	33908	K2 + Wire Loop in dead apple tree	
K9IS	WI	ALL	< 5W		170	24	7	28560	IC703 + Horz Loop	
KB0R	MN	ALL	< 5W	41	178	22	7	27412	Wilderness Sierra + G5RV	
KN1H	NH	ALL	< 5W	40	176	22	7	27104	FT817	
K3CHP	DE	ALL	< 5W	38	172	22	7	26488	FT817 + Vertical	
K3HX/4	NC	ALL	< 5W	39	162	22	7	24948	IC706 + 18ft telescoping vertical	
KF4UCC	VA	ALL	< 5W	35	157	22	7	24178		

Fall QSO Party Team Scores

Aluminum Kings	1,799,952
Beaverboys #1	1,480,311
Beaverboys #2	256,578
Eastern Pennsylvania QRPers	184,296

contest going on at the same time, 40 meters (out here in Utah) simply took a huge beating. Twenty meters, as often is the case for me, was the workhorse band with one short but nice opening on 15 meters Sunday afternoon. Look forward to the next one.—**K9JWV**. Condx not great; turn-out kind of mediocre—at least what I could hear! I always wonder if other QTHs are hearing many more stations than I am...—**W0RSP**. I feel lucky to have had any operating time and lucky the trapped dipole served pretty well as a backup. A real lesson in keeping some antenna available, even if it isn't what you really want or usually use. So the score ain't special, but hog's breath is better than no breath at all.—**K4KSR**. Poor conditions (again), but an enjoyable contest all the same. Nice to work so many familiar stations mixed in with some new ones. Thanks for the QSOs and see you in the next contest!—**WA5RML**. Nice time for contesting, but not much time available. Hopefully the Sun will make things exciting in the future.—**KD2JC**. Had loads of fun. I am always impressed how well 5W and less can play.—**WF7T**. WOW...lots of RTTY and then a couple other contests at the same time, it was great fun as usual though!—**KB9BVN**. Digital operators make 40 CW unusable. Activity level low on all bands. Good to hear Cam HP1AC again.—**K0LWV**. Where was everybody? Band condx seemed to be OK, but have rarely worked so hard for so few contacts. As always was still fun.—**VE6BIR/3**. I could hear local stations VA3RKM and VE3JM working other stations I could not copy. SWR on 80 and 40 would jump suddenly mid-QSO. Turns out it was a bad connector at the antenna.—**VE3KI**. No night time, no Sunday. I had a wedding to attend on Sunday in Connecticut. I did operate W1AW on

2008 Fall QSO Party Results (continued)

Call	S-P-C	Bands	Power	QSOs	Pts	SPCs	Mult	Score	Rig & Antenna	Team
WB3AAL	PA	ALL	< 1W	27	126	18	10	22680	K2 + Black Widow Vertical, doublet, HF9V, beam	EPA
N3A/9	IN	ALL	< 5W		135	23	7	21735		
W7IEX	NV	20	< 5W	32	142	21	7	20874		
AA5TB	TX	20/80	< 5W		140	21	7	20580	FT897D + Inv L	
WA0UDZ	TX	ALL	< 5W	28	131	7	22	20174	IC703+ + Gap Challenger Vertical	
WI9M	WI	ALL	< 5W	32	142	17	7	16898		
N3A/1	MA	ALL	< 5W		123	19	7	16359	K2 + Dipole	
N9XO	IN	20/40	< 5W	25	107	18	7	13482	IC706 MkIIG + Vertical, Windom	
W5ESE	TX	ALL	< 5W	19	89	18	7	11214	Argonaut 509 + 100m HOHPL	
WA1WQG	CT	ALL	< 5W		83	18	7	10458	K1 + OCF Dipole	
NU4B	TN	40/80	< 5W	21	93	15	7	9765	K2 + Carolina Windom Short 80	
NK6A	CA	20	< 5W	20	91	13	7	8281		
AB8FJ	OH	ALL	< 1W	17	67	11	10	7370	Argonaut II + End Fed Wire	
K8ZFJ	RI	20/40	< 1W		56	10	10	5600	Argo 515 + G5RV	
K8KFJ	WV	ALL	< 5W	13	65	12	7	5460	FT817ND + Vertical	
GM4XQJ	GM	20	< 5W	13	62	9	7	3906	K2 + TH3 Thunderbird	
KG1W	CT	20/40	< 5W	13	62	9	7	3906		
WB0OEW	NM	ALL	< 5W		62	9	7	3906	K1 + HFp vertical	
W1FMR/1	MA	20/40	< 5W	11	49	10	7	3430	Scout + Indoor 10ft magloop	
KI7Y	OR	15/20	< 5W	11	49	9	7	3087		
N0EVH	MO	20/40	< 5W		22	20	7	3080	K3 + Titan Gap Vertical	
N8WS	OH	20/40	< 5W	10	50	8	7	2800		
WB8LZG	MI	20/40	< 5W	10	47	8	7	2632	K2 + Dipoles, Longwire	
AE4EC	NC	ALL	< 5W	9	39	9	7	2457		
W2ARP	NJ	20/40	< 5W		46	7	7	2254	FT817 + Alpha Delta DXCC	
WB5FKC	TX	40	< 55mW	10	23	4	20	1840		
KD2MX	NJ	20/160	< 5W	7	35	7	7	1715	FT897 + 350ft long wire	
AB8DF	MI	20/40	< 5W	7	32	7	7	1568	K2 + 100ft wire centre fed with window line	
W9VQ	IL	20/40	< 5W	8	37	5	7	1295	IC706 MkIIG + Force 12 C3SS, Alpha Delta V Dipole	
KD5RSS	OK	20/40	< 5W		29	5	7	1015	K1 + Dipole	
KJ4WD	NC	ALL	> 5W	14	67	13	1	871		
KF3CV	MD	40	< 5W	6	30	4	7	840	IC756 + Dipole	
VE3EUR	ON	40/80	< 5W		22	5	7	770	IC703 + 40m dipole	Beaverboys #2
AA7CU	OR	20	< 5W	1	5	1	7	35	IC703	
K9FH	IL	20	> 5W	2	10	2	1	20	TS-2000 + 40m Delta Loop	
KK4R	VA	ALL	< 5W	20	97	14	7	Checklog	K2, FT817 + Dipole	
K2QO	NY	ALL	< 5W	346			7	Checklog	2 x K2	
N1NN	MA	40	> 5W	1	2	1	1	Checklog		

Monday and Tuesday on 30 meters CW.—**K0ZK**. I enjoyed the contest. Maybe next year propagation will be better for 20 meters and up.—**K9IS**. The digital trash on 40 meters has to go— **K3CHP**. Had fun working the usual calls in the QRP. Just wished I had more time for operating—**WB3AAL**. Fun contest—not a lot of time to operate, but nice to use special event call N3A/1 for the 4th anniversary of NAQCC—North American QRP CW Club.—**Op. W1OH, N3A/1**. Alternated between calling CQ and S&P. Lots of RTTY around 7.030 Sunday afternoon and evening. Enjoyed the event as always.—**AB8FJ**. That was fun after a several year "vacation" from hamming— **K8ZFJ**. Family activities kept me pretty much off the air until the last two hours. Got on to say hello to old and new friends, sorry I missed many of you. The bands did seem to be slightly improved over last year.—**N0EVH**. Time was short, and conditions not so great. It was exciting to work HP1AC for a 2x QRP DX contact.—**KD2MX**. My first QRP ARCI QSO party. While my numbers don't set any records, the challenge of qrp was worth it. I'm looking forward to the next one.—**KD5RSS**. Multi-Op Checklog with KK4R and K4AEN. Tom and I took his sailboat across the York River from Yorktown to Sarah Creek and anchored up the creek. The original plan called for sailing up to Mobjack Bay and into the East River, as we have done before, but the wind was really blowing out of the North, and the seas were rough. It didn't take long to rig the dipole up and haul it up the mast. It made a pretty radical angle at the peak, but we had done OK with it before. This was the maiden voyage for my new K2, so we played with it for a while, but the battery on the boat wasn't holding a charge, so we switched to the 817 with its internal battery. Going was slow, and it will be interesting to see if it was the bands or we just weren't getting out. The highlight of the trip was a long QSO with Mark, NK8Q, known as Polar Bear No. 4. He gave us some laughs and a big lift before bedtime. Since the QRP contest was slow, we retired and enjoyed a lively snoring contest. Tom won—he always does—I should get a multiplier for using less power.—**KK4R**. Multi-Op Checklog with K2QO and KB2AIV and K2ZR.—**K2QO**.

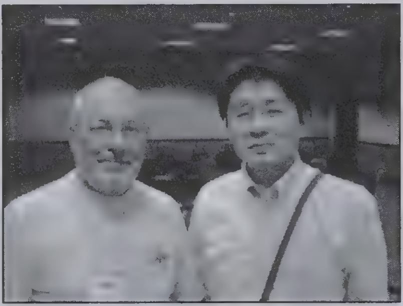
JARL QRP Club Announces the First "Ultimate QRP" Competition

A Message from Takumi (Tak), 7L3DNX:

Dear Dick Pascoe, G0BPS,

It was great to see you at FDIM in Dayton past May 2008.

I have accepted the position of Secretary General of JARL QRP Club in April this year. The term of this appointment is for 3 years. One of the objectives we have adopted for the club is to "globalize" ourselves. We are putting our plans into action as we speak.


G0BPS and 7L3DNX at FDIM Dayton in May 2008.

The main concept we would like to push globally is the concept of "Total Power" used in achieving a communication. As I explain later in more detail, the "Total Power" is the sum of all power used to achieve a communication—in transmitting, in receiving and including all the power used by the peripheral equipments employed. We would like to promote the use of "distance achieved (km) per used total power (W)" as the measure of achievement.

As our first steps in achieving this goal, we propose the following:

1. Sponsor a 144 MHz (2m) FM competition entitled "Ultimate QRP" to be introduced as part of 2009 Ham Fair in Tokyo.
2. The participants will be required to rig up a transmitter and a receiver (including any peripheral equipments) with minimal energy consumption.
3. Competitor's achievements will be measured in "distance achieved (km) per used total power (W)".

So, as you may have guessed, here is the purpose of our letter: we would like to invite the members of QRP ARCI (as well as G QRP Club) to participate in this competition. Further information is available in later this letter.

If this first competition is successful, we plan to expand it to 21 MHz SSB mode in 2010!!

We would also like to invite you to come to Japan during the period of this competition. Especially, it is the best timing for you on 21 MHz SSB mode competition in 2010. Our Club will be able to contribute 100,000 JPY towards the costs of your travel. With the exchange rates fluctuating violently, it's hard to say exactly, but it is probably around 500 GBP as a guide. We know that 500 pounds is only a very small inducement but we hope you can give this idea favorable consideration.

If you find yourself able to visit us in Japan, we would like you to:

- Meet the members of our Club. With only a very small number of exceptions, we are unable to converse in English. However, meeting you will give us all a great pleasure!
- Attend dinner on the first evening of Ham Fair
- Be one of the presenters of the competition awards at the conclusion.

I don't believe the concept of "Total Power" nor measuring achievements using "distance achieved (km) per used total power (W)" is so common amongst QRPers. We would welcome your views on this matter, perhaps to be published in our newsletter.

That's enough from me for now. I look forward to hearing from you soon. Also, please visit our club website.

JARL QRP CLUB Website URL: http://www.jaqrp.org/

Regards and Thanks,
Takumi (Tak) / 7L3DNX

Comments from Tadashi Okubo, JH1FCZ:

2009 Tokyo Ham Fair—Theme "Ultimate QRP" Competition in 144 MHz FM Mode

How does the world see JARL QRP Club? My view is as follows:-

JARL QRP has high level of technical expertise. However, we run into difficulties when asked to articulate our findings and technological developments in English. The world does not see our achievements.

To combat this situation, we are working to "globalize" JARL QRP Club. The biggest obstacle is the language. We must work to overcome this situation.

Our Club provides "1000 km/TP" awards—the ultimate achievement for a QRPer. But is anyone else striving to achieve this feat outside of Japan? I don't think so.

This competition is designed to tackle this issue head-on. By adopting "distance achieved (km) per used total power (W)" as the universal success measure, we are able to compare technological and operational capabilities across many QRP clubs in the world. We also propose to include all power usage—in transmitting, in receiving and including all the power used by the peripheral equipments employed.

Our plan is to run a relatively small scale pilot in 2009 by incorporating a 144 MHz FM mode "Ultimate QRP" competition into Tokyo Ham Fair. If successful, we plan to expand this competition to 21 MHZ SSB mode in 2010.

Our club has hardly any records in this class—which translates to no complicating handicap issues to be dealt with. It will allow us to be creative in this new frontier—a breath of fresh air!

A brief outline of this competition is as follows. We invite you to provide us with your feedback before finalising the condition of entry. We look forward to your constructive opinions.

1. All participants are required to design their own 144 MHz FM transmitter and receiver. Any circuits can be used, including the commercially produced ones (although this may be a disadvantage when calculating TP).
2. Apply for licence for the transceiver.
3. Participants start communication from the date of the licence.
4. The last day of the competition is 30 June 2009.
5. Competition entries close on 15 July 2009. Entries must include the transmitter and receiver's total power consumption data and the TP records.
6. Competition results to be announced during Tokyo Ham Fair in 2009.
7. Competitors must be members of JARL QRP Club. In order to globalise the competition, invitations will be issued to overseas QRP clubs as well.
8. We require volunteers to organise the competition. Organisers are also permitted to participate. See September newsletter for more details.
9. Final details governing this competition will be published in November newsletter.
10. Some 144 MHz crystals are available for participants. Numbers are limited, however, for members of G QRP Club, we have set aside 5 crystals and 20 x 144 MHz FCZ coils. Please advise your preferred frequency.

We have some Crystals below. Please choice five crystals as your favorite Frequency and let us know. Then we will send to you them.

By JH1FCZ (Tadashi Okubo)
JARL QRP CLUB President

QRP's objective is generally considered to be "How far can your signal go with minimal power?" To use today's parlance, it is "energy efficient communication."

In this sense, "Minimal Power" points to the "transmitting power." Take a 10W transmitter and reduce the output to 1W using an attenuator. That is technically a "QRP" but it feels less than satisfactory.

The obvious next step is to limit the amplifier power, i.e. use a transmitter that is only capable of 1W of output power. Where do you get such a transmitter? Well, you make your own, of course. This is the "usual QRP."

But can you go one step further? As an expert QRPer, you may feel real QRP requires the total energy consumption of the transmitter to be "minimal." To achieve this goal, you may have to create a circuit of your own. Some aerial/antenna R&D may also be required. Now that's "superior QRP" — or is it?

What about the receiver energy consumption? Nothing's been done about that yet. We must overcome this issue to be a "true QRP." Even amongst QRPers, it hasn't been common to consider the power consumption of a receiver. But surely, communication requires transmitters and receivers. We must limit the total power consumption—completely energy efficient—to achieve "Ultimate QRP."

JARL QRP Club has been awarding "1000km /Total Power" prizes to members who achieve 1000km or more per 1W. It is calculated by dividing the total distance achieved by total power consumption (total power consumed by ALL equipment used including the transmitter, receiver and any other peripheral equipments such as heating for vacuum tubes, keyers, counters, computers, etc.)

The 2009 "Ultimate QRP" competition in 144 MHz (2m) FM mode has been designed to proliferate this concept of "Ultimate QRP" and at the same time, to provide R&D incentives in the area of VHF / UHF.

It is also hoped that this competition will help globalise our QRP Club—by inviting the members of other renowned QRP Clubs around the world to participate in this competition. JARL QRP Club has celebrated its 50th anniversary in 2007. In this time, we have made a number of achievements in transmitter, receiver and in antenna developments. We must share these achievements with the rest of the world.

If successful, we plan to expand the competition to 21 MHz SSB mode in 2010.

QRP: Small Power, Big Dreams!

Contest Announcements

E-mail Log Submission:

Submit Logs in plain text format, with a summary stating your Callsign, Entry Category, Actual Power and Station Description, along with score calculation to contest@qrparci.org

Mail Log Submission:

Submit Logs with a summary stating your Callsign, Entry Category, Actual Power and Station Description, along with score calculation to:

(Contest Name)
c/o Jeff Hetherington, VA3JFF
139 Elizabeth St. W.
Welland, Ontario
Canada L3C 4M3

Results:

Will be published in *QRP Quarterly* and shown on the QRP-ARCI website.

Certificates:

Awarded to the top scoring entrant in each category. Certificates may be awarded for 2nd and 3rd place if entries are sufficient in a category. Some contests award certificates to the top scoring operators in each State, Province or Country.

2009 QRP-ARCI HF Grid Square Sprint

Date/Time:

1500Z to 1800Z on 14 March 2009.

Mode:

HF CW only.

Exchange:

Members send: RST, 4-digit Maidenhead Grid Square (i.e. FN02), ARCI member number

Non-Members send: RST, 4-digit Maidenhead Grid Square (i.e. FN02), Power Out

QSO Points:

Member = 5 points
Non-Member, Different Continent = 4 points
Non-Member, Same Continent = 2 points

Multiplier:

Grid Square total for all bands. The same station may be worked on multiple bands for QSO points and Grid Square credit.

Power Multiplier:

>5 Watts = x1
>1 - 5 Watts = x7
>250 mW - 1 Watt = x10
>55 mW - 250 mW = x15
55 mW or less = x20

Suggested Frequencies:

160m	1810 kHz
80m	3560 kHz
40m	7030 kHz (also listen at 7040 kHz)
20m	14060 kHz
15m	21060 kHz
10m	28060 kHz

Bonus Points:

If you are operating PORTABLE using battery power AND a temporary antenna, add 5000 points to your final score. (You can NOT be at your shack operating from battery power using your home station antenna to qualify for this bonus.) This is to help level the playing field for contesters who work from the field against contest stations with 5 element yagis at 70 ft.

Score:

Final Score = Points (total for all bands) x Grid Squares (total for all bands) x Power Multiplier + Bonus Points

Categories:

Entry may be All-Band, Single Band, High Bands (10m-15m-20m) or Low Bands (40m-80m)

How to Participate:

Get on any of the HF bands except the WARC bands and hang out near the QRP frequencies. Work as many stations calling CQ QRP or CQ TEST as possible, or call CQ QRP or CQ TEST yourself! You can work a station for credit once on each band.

Log Submission Deadline:

Entries must be postmarked on or before 14 April 2009.

2009 QRP-ARCI Spring QSO Party

Date/Time:

1200Z on 4 April 2008 through 2359Z on 5 April 2009. You may work a maximum of 24 hours of the 36 hour period.

Mode:

HF CW only.

Exchange:

Members send: RST, State/Province/Country, ARCI member #
Non-Members send: RST, State/Province/Country, Power Out

QSO Points:

Member = 5 points
Non-Member, Different Continent = 4 points
Non-Member, Same Continent = 2 points

Multiplier:

SPC (State/Province/Country) total for all bands. The same station may be worked on multiple bands for QSO points and SPC credit.

Power Multiplier:

>5 Watts = x1
>1 - 5 Watts = x7
>250 mW - 1 Watt = x10
>55 mW - 250 mW = x15
55 mW or less = x20

Suggested Frequencies:

160m	1810 kHz
80m	3560 kHz
40m	7030 kHz (also listen at 7040 kHz)
20m	14060 kHz
15m	21060 kHz
10m	28060 kHz

Score:

Final Score = Points (total for all bands) x SPCs (total for all bands) x Power Multiplier.

Teams:

You may enter as a team with an unlimited number of operators as long as no more than 5 transmitters are on the air concurrently. You compete individually as well as on the team. Team members need not be in the same location. Team captains must send a list of members to the Contest Manager before the contest.

Categories:

Entry may be All-Band, Single Band, High Bands (10m-15m-20m) or Low Bands (40m-80m-160m)

How to Participate:

Get on any of the HF bands except the WARC bands and hang out near the QRP frequencies. Work as many stations calling CQ QRP or CQ TEST as possible, or call CQ QRP or CQ TEST yourself! You can work a station for credit once on each band.

Log Submission Deadline:

Entries must be postmarked on or before 5 May 2009.

2009 QRP-ARCI Hoot Owl Sprint

Date/Time:

8pm to Midnight LOCAL TIME on 31 May 2009.

Objective:

To test your ability to make contacts late into the evening local time.

Mode:

HF CW Only.

Exchange:

Members send: RST, State/Province/Country, ARCI member #
Non-Members send: RST, State/Province/Country, Power Out

QSO Points:

Member = 5 points
Non-Member, Different Continent = 4 points
Non-Member, Same Continent = 2 points

Multiplier:

SPC (State/Province/Country) total for all bands. The same station may be worked on multiple bands for QSO points and SPC credit.

Power Multiplier:

>5 Watts = x1
>1 - 5 Watts = x7
>250 mW - 1 Watt = x10
>55 mW - 250 mW = x15
55 mW or less = x20

Suggested Frequencies:

160m	1810 kHz
80m	3560 kHz
40m	7030 kHz (also listen at 7040 kHz)
20m	14060 kHz
15m	21060 kHz
10m	28060 kHz

Score:

Final Score = Points (total for all bands) x SPCs (total for all bands) x Power Multiplier Bonus Points.

Bonus Points:

If you are operating PORTABLE using battery power AND a temporary antenna, add 5000 points to your final score. (You can NOT be at your shack operating from battery power using your home station antenna to qualify for this bonus.) This is to help level the playing field for contesters who work from the field against contest stations with 5 element yagis at 70 ft.

Categories:

Entry may be All-Band, Single Band, High Bands (10m-15m-20m) or Low Bands (40m-80m-160m)

How to Participate:

Get on any of the HF bands except the WARC bands and hang out near the QRP frequencies. Work as many stations calling CQ QRP or CQ TEST as possible, or call CQ QRP or CQ TEST yourself! You can work a station for credit once on each band.

Log Submission Deadline:

Entries must be postmarked on or before 30 June 2009.

2009 QRP-ARCI milliWatt Field Day Contest

Date/Time:

1800Z on June 27, 2009 through 2100Z on June 28, 2009.

Bands:

All bands (HF & VHF+) as outlined in the ARRL Field Day Rules

Exchange:

Class/ARRL Section, per ARRL Field Day Rules

QSO Points:

CW = 2 points/QSO, SSB = 1 point/QSO, Digital = 2 points per QSO

Power Multiplier:

Use the lower power multiplier for the HIGHEST power you used in the contest. Power multiplier for all contacts:

>5W = X1
>1-5W = X7
>250mW - 1W = X10
>55mW - 250mW = X15
55mW or less = x20

Score:

Points (total for all bands) x Power Multiplier.

Bonus Points:

There are NO bonus point for this contest.

Categories:

(Class A) Club/non-club portable
(Class B) One or two person portable
(Class C) Mobile: Stations in vehicles capable of operating while in motion and normally operated in this manner
(Class D) Home stations: Stations operating from licensed station locations using commercial power
(Class E) Home stations—Emergency power
(Class F) Emergency Operations Centers (EOC)

Best reason to participate:

A fun mixed mode QRP contest and a chance to test/prove emergency preparedness.

Deadline:

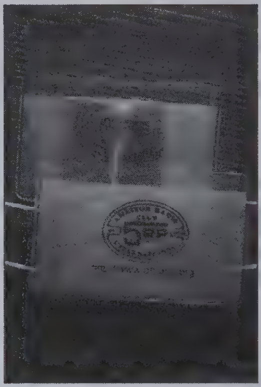
Entries must be postmarked on or before 28 July 2009.

●●

The QRP-ARCI Toy Store

The **Official** QRP-ARCI Coffee Mug. Used by the top QRP Fox Hunters, contesters and casual operators found near the normal QRP Frequencies.
The Logo is on both sides. Coffee, tea or milk not included.

The QRP-ARCI patches are fully stitched, black on white. 3 9/16" wide X 2 1/2" high oval. And they can either be ironed on, or sewn on the finest evening wear! Also available in Blue & Brass metal pins



Trouble reading those resistors? Plastic magnifiers for kit builders in a carrying case. Magnifiers $1.00 each

Polo Shirts with the logo above the pocket and **your** name and call. $30 postpaid (Add $2 for sizes XXL and above) Allow approximately 3-4 weeks for delivery Red, blue, green or white.

Also available—Key holders (2/$1), Pens (2/$1) all with the QRP-ARCI logo, and most back issues of the QRP Quarterly.

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CD Holders - hold 24 of your favorite QRP and Ham Radio CD's. Red, Blue or Black. $6

2nd Edition of the HW-8 Handbook..... $20
Covers the HW-7, 8 & 9 — Lots of new material!

See http://www.qrparci.org (QRP Toy Store link) for pictures

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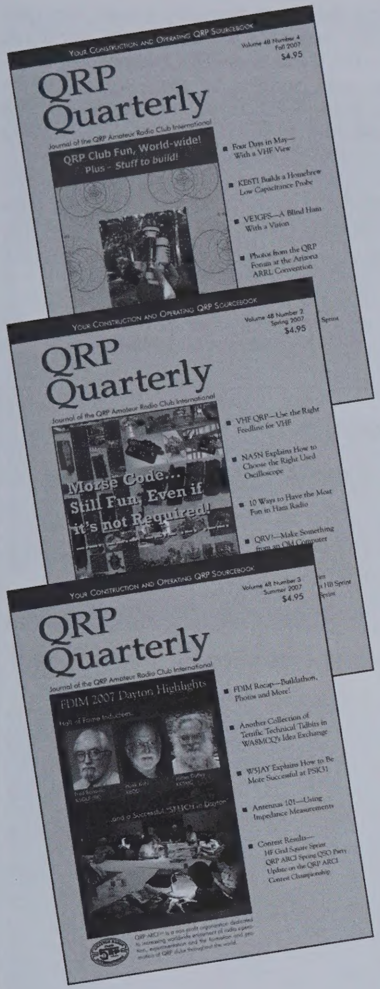

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United States Postal Service

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1. Publication Title: QRP Quarterly
2. Publication Number: 1551-1537
3. Filing Date: 9/28/2008
4. Issue Frequency: Quarterly-Four times per year
5. Number of Issues Published Annually: Four
6. Annual Subscription Price: $20.00-USA $23.00 Canada, and Elsewhere
7. Complete Mailing Address of Known Office of Publication *(Not printer) (Street, city, county, state, and ZIP+4)*: Summit Technical Media, LLC, 3 Hawk Drive, Bedford, NH 03110-4804
Contact Person: Scott L. Spencer
Telephone: 603 472 8261
8. Complete Mailing Address of Headquarters or General Business Office of Publisher *(Not printer)*: Summit Technical Media, LLC, 3 Hawk Drive, Bedford, NH 03110-4804
9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor *(Do not leave blank)*
Publisher *(Name and complete mailing address)*: Scott L. Spencer, PO Box 10621, Bedford, NH 03110
Editor *(Name and complete mailing address)*: Ted Bruce, 3625 Longfellow Trail, Marietta, GA 30062
Managing Editor *(Name and complete mailing address)*: Gary A. Breed, 104 S. Grove Street, Mount Horeb, WI 53572
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11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box ► ☒ None

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12. Tax Status *(For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)*
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☒ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months *(Publisher must submit explanation of change with this statement)*

PS Form **3526**, October 1999 *(See Instructions on Reverse)*

13. Publication Title: QRP Quarterly
14. Issue Date for Circulation Data Below: Fall 2008

15. Extent and Nature of Circulation			Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies *(Net press run)*			2291	2288
b. Paid and/or Requested Circulation	(1)	Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	1857	1843
	(2)	Paid In-County Subscriptions Stated on Form 3541 *(Include advertiser's proof and exchange copies)*	0	0
	(3)	Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution	75	75
	(4)	Other Classes Mailed Through the USPS	296	305
c. Total Paid and/or Requested Circulation *[Sum of 15b. (1), (2),(3),and (4)]* ►			2228	2223
d. Free Distribution by Mail *(Samples, compliment ary, and other free)*	(1)	Outside-County as Stated on Form 3541	0	0
	(2)	In-County as Stated on Form 3541	0	0
	(3)	Other Classes Mailed Through the USPS	18	18
e. Free Distribution Outside the Mail *(Carriers or other means)*			45	45
f. Total Free Distribution *(Sum of 15d. and 15e.)* ►			63	63
g. Total Distribution *(Sum of 15c. and 15f)* ►			2291	2286
h. Copies not Distributed			0	2
i. Total *(Sum of 15g. and h.)* ►			2291	2288
j. Percent Paid and/or Requested Circulation *(15c. divided by 15g. times 100)*			97%	95%

16. Publication of Statement of Ownership
☒ Publication required. Will be printed in the Fall 2008 issue of this publication. ☐ Publication not required.
17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Scott L. Spencer, Publisher
Date: 9/30/2008

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

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5. If the publication had Periodicals authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
6. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
7. Item 17 must be signed.

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PS Form **3526**, October 1999 *(Reverse)*

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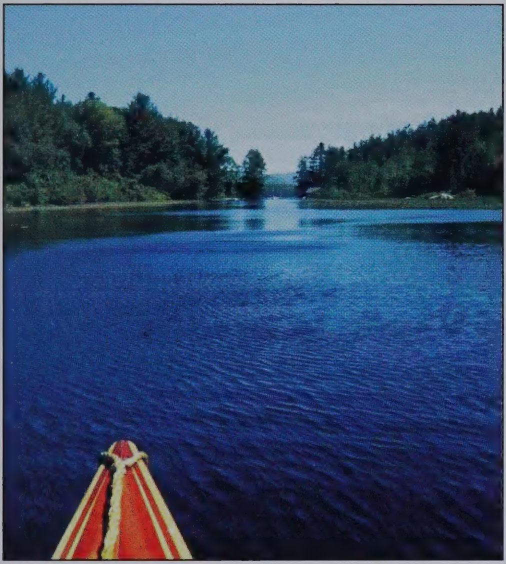
Photos from "Outdoor Radio (QRP, of Course)" by Jim Cluett, W1PID:

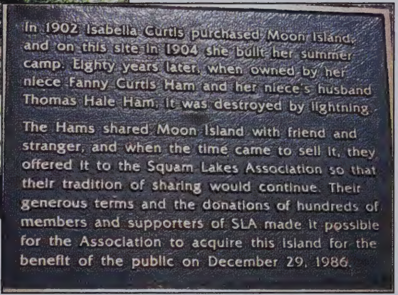
Bridge on the hike to the Knox Mountain cabin.

Preparing to leave for a Moon Island camping trip.



View from the canoe.

Bill, AB1AV, poses by the foundation of the old "Ham's" cabin, described by this bronze plaque



In 1902 Isabella Curtis purchased Moon Island, and on this site in 1904 she built her summer camp. Eighty years later, when owned by her niece Fanny Curtis Ham and her niece's husband Thomas Hale Ham, it was destroyed by lightning.

The Hams shared Moon Island with friend and stranger, and when the time came to sell it, they offered it to the Squam Lakes Association so that their tradition of sharing would continue. Their generous terms and the donations of hundreds of members and supporters of SLA made it possible for the Association to acquire this island for the benefit of the public on December 29, 1986.

Jim, W1PID, shows us that outdoor radio isn't just for warm weather, but you might not stay long without the right gear (personal *and* radio)!

This maple tree made an exceptionally attractive "antenna support" for W1PID's 2008 Fall QSO Party outing!

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